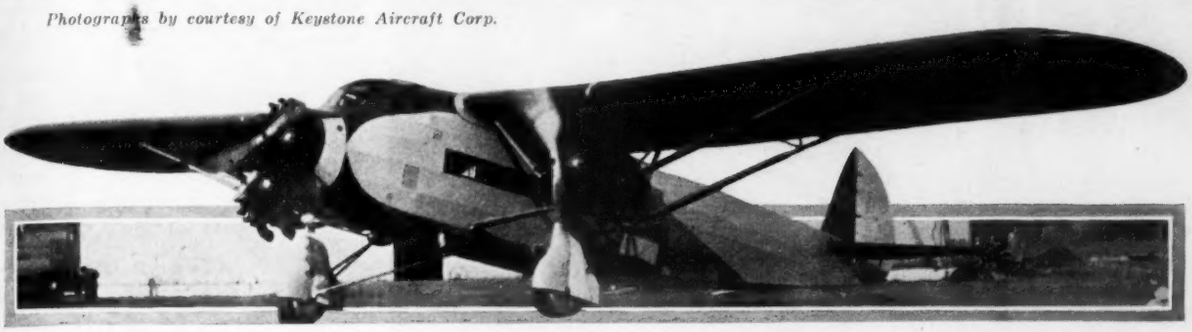
Volume 83
Number 24

IRON TRADE REVIEW

Cleveland, O.
Dec. 13, 1928

Photographs by courtesy of Keystone Aircraft Corp.



22-PASSENGER TRI-MOTOR "PATRICIAN" COMPLETED RECENTLY BY KEYSTONE AIRCRAFT CORP. AT A COST OF $75,000

This plane was damaged by fire in its hangar on Nov. 21 just previous to an impressive dedication ceremony which had been planned to take place in Washington upon its entry in Atlantic Coast passenger service. According to Edgar N. Gott, president of the company, the fire showed the advantage of tubular steel construction. The framework was not damaged

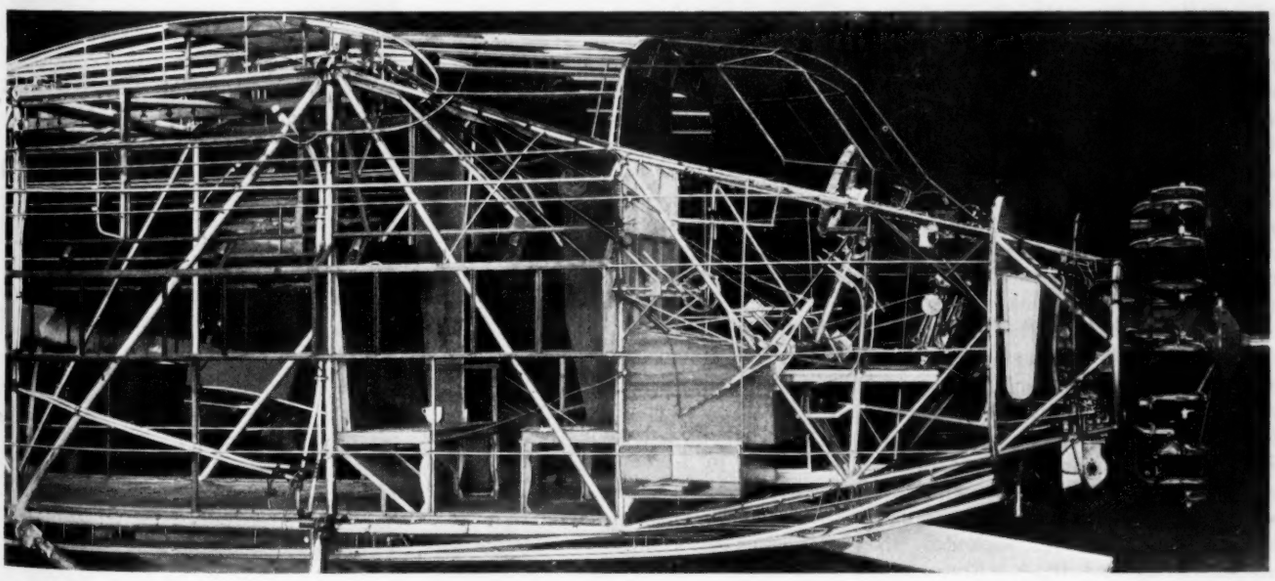
Alloy Steels Assume Important Role in Manufacture of Airplanes

By Edwin Joyce

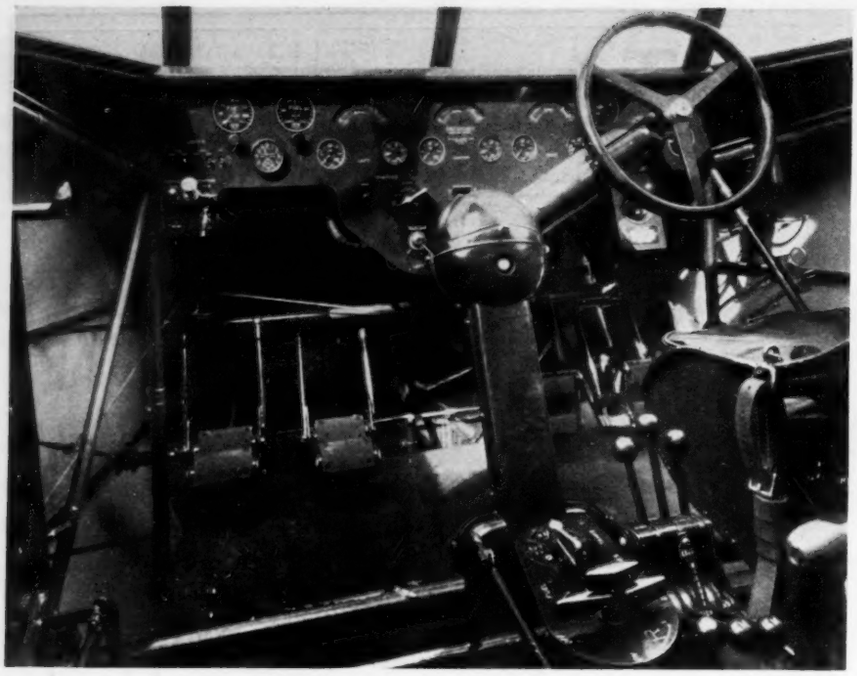
ANY serious attempt to describe the progress in airplane construction during the past ten years must take into consideration the rapid and rather complete change in the use of materials of construction. This change from wood used during the war period to all-metal construction now standard with many builders has been made possible because improved alloy steels and aluminum alloys have become available in suitable shapes and forms to aircraft builders.

Although wood is still used in such parts as wing beams, ribs, etc., its use may be attributed to established production facilities or to low-strength requirements as on the smaller models. The history of engineering progress in other fields is sufficient evidence that these practices will in time be supplanted by the more modern metal construction. Progress has in many instances been retarded by the difficulty in securing the desired materials in suitable forms and by the

The author, Edwin Joyce, is associate metallurgist, Naval Aircraft factory, Philadelphia.



A view of the PATRICIAN *showing the construction of the forward part of the fuselage*



Cockpit details may be observed in this illustration taken from back of the pilot's seat

lack of knowledge of fabricating and joining methods. A large amount of metallurgical investigation has been required and is now being undertaken by the pioneers. Such investigations, accompanied by laboratory and service tests of fabricated structures, have been vital factors in this progress and have been a benefit to other industries as well.

Aircraft engines, of course, always have been constructed of metal. They have been developed to their present high standard of efficiency and reliability by the careful selection of material to meet the rigid requirements of each part and by careful heat treatment to bring out the required properties. Only about 50 per cent by weight of the modern engine is made of steel; other metals used are aluminum, aluminum alloys, bronze, brass and copper. The steel is usually of the high-strength types, some of which have quite complex compositions. So specialized has engine construction become that most aircraft builders prefer to secure their power plants from an industry already well established and well experienced in their manufacture.

Care Required in Design

The structural members of airplanes also require careful engineering design and metallurgical control in their fabrication. The metals used are no less varied than those used in engine construction. In the planes which occupy the middle ground as regards weight and carrying capacity, the predominating metal is either alloy steel or duralumin and in some cases both are used in combination. Welding of duralumin has not been greatly successful, although welded aluminum is used rather generally in the manufacture of tanks and shapes requiring low strengths. Duralumin has largely replaced the use of wood in the construction of hulls, floats and pontoons for seaplanes. Such structures usually are made with riveted or bolted seams and joints as is also the case in the use of this material for parts of land planes. Such methods are usually attended by high construction costs and more or less trouble in making water or gasoline tight seams. Duralumin has good strength and lightness and is for that reason the chief competitor of alloy steels. Its tensile strength is 55,000 pounds per square inch.

Alloy steel is used principally in the form of thin-walled tubing. The steel therefore should have good drawing properties in order to facilitate the production of such forms. For the manufacture of fittings the steel should possess good cold-bending properties. High strength, of course, is a primary requisite. Fabrication of steel structures and fittings is most easily and economically accomplished by welding, but this method is seldom applicable except when high strength is attainable without subsequent heat treatment. Structures usually are of such size and complexity that heat treatment of a completed unit is not feasible.

Chrome-molybdenum steel has these properties to a most remarkable degree and its use in rapidly increasing amounts is justified by the splendid results obtained in extended service tests. The alloy usually selected for airplane construction is S.A.E. No. 4130X, a modified 4130 steel, of the following composition:

	Per Cent
Carbon	0.25-0.35
Manganese	0.40-0.60
Phosphorus (maximum)	0.040
Sulphur (maximum)	0.045
Chromium	0.80-1.10
Molybdenum	0.15-0.25

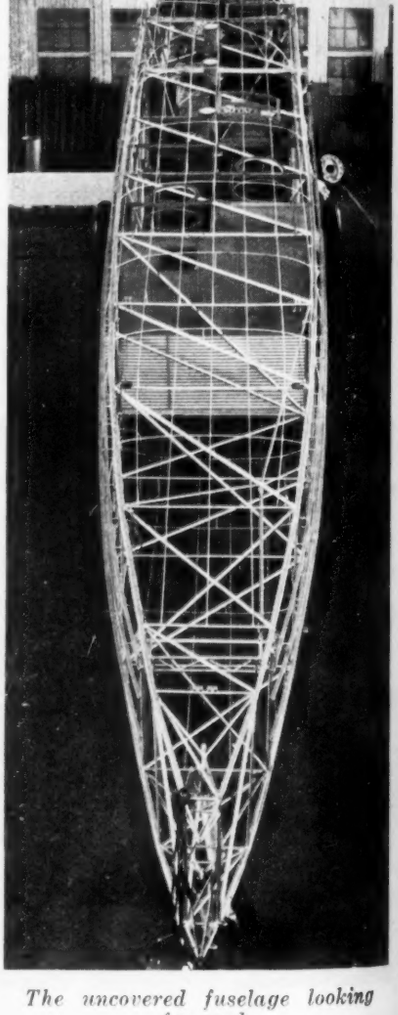
Most of this steel is purchased in the normalized condition in the form of thin-walled tubing and is welded directly into structural units without further heat treatment. In such condition, these structures, if properly welded, should develop the following physical properties:

Tensile strength, pounds per square inch	95,000
Yield strength, pounds per square inch	60,000
Elongations in 2 inches, per cent	10.0

A unit stress of 80,000 pounds per square inch for the section of the weld is commonly used for design in order to take care of imperfections in the weld.

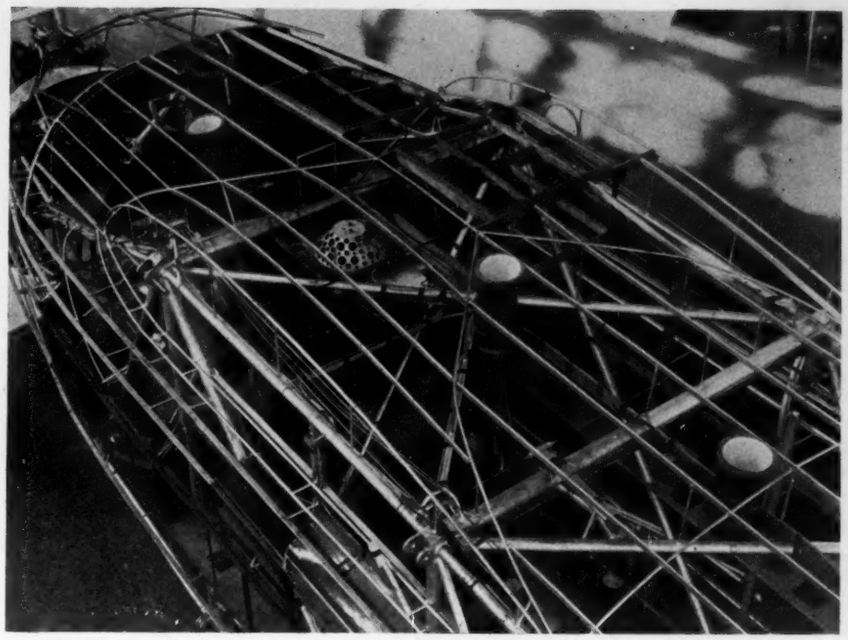
Two Welding Methods

This tubing may be welded with either the oxyacetylene flame or the electric arc. The flame method usually produces more sightly joints but re-



The uncovered fuselage looking forward

quires greater skill. On account of the difficulty of judging the soundness of welded joints by their outward appearance, it is considered good practice to require the welders at frequent intervals to make test specimens for tensile tests in order to check the work of each individual and to keep the quality of the welds at a maximum. Welds are usually of the "fish-mouth" type in which two tubes of slightly different diameters are welded at their telescoped ends; of the slot and tangent-types for attachment of fittings and the butt-type for joining the various tension and compression members at intersections. Reinforcing straps frequently are used to add strength to the welded joints. These types of welds and the complexity of a modern fuselage are well illustrated in the accompanying photographs of a large plane recently completed for Atlantic Coast passenger service.



Another view of the forward end of the fuselage. The chrome-molybdenum steel and duralumin construction is clearly shown

Care Produces Strong Weld

More care is required than for welding S.A.E. No. 1025 steel to prevent burning and overheating of the weld and also to prevent gas inclusions. The welds themselves usually are stronger than the original steel in the region just outside of the weld. This steel is air hardening and the heated part of the welded structure retains most of its normalized strength due to the partial heat treatment which it receives. There exists a difference of opinion as regards the best composition of welding rod. Swedish iron is used, also mild and medium-carbon steel and alloy steel. The technique of individual welders has much influence on the weld and the choice of the most desirable type of rod should be determined by test welds.

Fittings are usually made from sheet and bar stock having the same chemical composition as given above, but purchased in the annealed condition to permit fabrication without injury. In this condition the steel should develop the following physical properties, due allowance being made for very thin or thick stock:

Tensile strength, pounds per square inch	78,000
Yield strength, pounds per square inch	55,000
Elongation in 2 inches, per cent	22.0

The fittings are easily made by punching, forming and welding and as the work is usually bench work the use of chrome-molybdenum steel has substantially decreased the cost of such parts in comparison with those machined from bar or forged stock of steels which are not weldable. Cold bends of 180 degrees over a radius equal to one-half the thickness of the sheet are made easily without danger of cracking and without spring-back when released from the bending jigs.

Welded fittings are heat treated to the desired strength, usually 125,000 pounds per square inch, although much higher values may be obtained if desired. Two typical heat treatments are:

No. 1—125,000 *pounds per square inch tensile strength*

1. Heat to 1600-1650 degrees Fahr.
2. Quench in water.
3. Temper at 1130 degrees Fahr. Cool in air.

No. 2—150,000 *pounds per square inch tensile strength*

1. Heat to 1600-1650 degrees Fahr.
2. Quench in water.
3. Temper at 970 degrees Fahr. Cool in air.

These two heat treatments should produce elongations in 2 inches of 18 and 12 per cents respectively. Much higher tensile strengths, of course, can be developed with corresponding decrease in elongation. The temperature of the furnace at the time of inserting the steel should be approximately 1100 degrees Fahr. and that at which tempering should be started, 800 degrees Fahr. The length of time for heating and holding at the soaking temperatures should be varied to suit the thickness of material. There is a tendency for chrome-molybdenum steel to decarburize on the surfaces during soaking periods at elevated temperatures and such injury causes considerable decrease in tensile strengths of very thin material. Scaling is also quite pronounced and is equally objectionable on thin stock. Care in selecting equipment and in establishing heat treating practices is most effective in preventing such injury.

Mild steel tubing S.A.E. No. 1025, is generally considered not strong enough in welded tension members but may be used safely as compression members in welded chrome-molybdenum steel structures. Welding of the two steels does not present any particular difficulty and the advantage of such practice lies only in a small decrease in material cost.

Other Steels Are Used

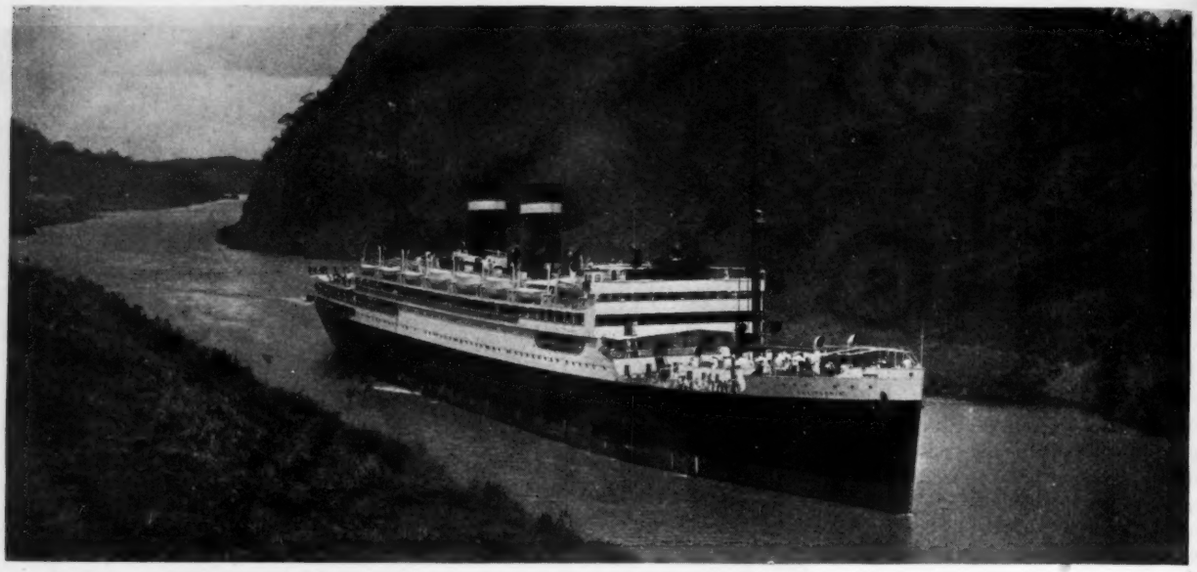
Another steel of importance in airplane construction is the 3.5 per cent nickel alloy (S. A. E. No. 2330) which has the following chemical composition:

	Per cent
Carbon	0.25-0.35
Manganese	0.50-0.80
Phosphorus (maximum)	0.040
Sulphur (maximum)	0.045
Nickel	3.25-3.75

This steel has a fine range of physical properties, but unfortunately does not give high strength values after welding. It is used largely in the production of heat-treated members requiring high strength and good ductility, such as bolts, pins, etc. Plain carbon steel has its greatest application in the form of streamline wire and tie rods for which S.A.E. No. 1045 steel is used, and in the form of springs for which S.A.E. No. 1095 steel rod is suitable. Judging by past experience these uses for straight carbon steels will yield to the demand for the greater strength and reliability obtained from the use of alloy steels.

Another class of ferrous alloys which have distinct possibilities for aircraft construction, especially where the deteriorating effects of corrosion

(*Concluded on Page* 1495)



S. S. CALIFORNIA *passing through Gaillard Cut, Panama Canal, Feb.* 3, 1928, *on her maiden voyage to San Francisco. Her sister ship* S. S. VIRGINIA, *twelve feet longer, sailed on her maiden voyage from New York to San Francisco, Dec.* 8

What Revival of Shipbuilding Means to Industry

By A. H. Jansson

SHIPBUILDING, an old market not much considered in the last eight years, is on the threshold of remarkable expansion. This statement is based on certain definite facts. It is the purpose of this article to set forth the reasons for this expansion. But before going into this let us consider for a moment what the building of a ship means to industry. A careful analysis by H. G. Smith, vice president of the Bethlehem Shipbuilding Corp. and spokesman for the National Council of American Shipbuilders, shows that in the cost for instance of a 10,000-ton freighter vessel, the material used will represent 50.2 per cent of the total. In other words, for every $1,000,000 paid out for completed vessels $502,000 is for material ordered from practically every industry in the United States.

Again, an analysis by Mr. Smith of the material distribution of an actual vessel built at one of the large American shipyards shows that practically every state in the Union participated in the material required in its construction. Also contrary to general belief, the "iron and steel" in a ship is probably not over 20 per cent of the total material cost. Of course this places iron and steel as the chief basic material in the building of the ship, but it must be remembered that the balance of the material cost amounting for every $1,000,000 paid for the completed ship to somewhat over $400,000 is laid out for materials such as copper, tin, zinc, lead, lumber and allied products, textiles and their products, rubber products, leather, electrical products, stone clay and glass products, all of the elements entering into auxiliary machinery running through the entire gamut of material down to miscellaneous hardware and food supplies. This is what shipbuilding means to industry.

Basis for Great Expansion

Now on what basis can we say that shipbuilding in the United States is on the threshold of tremendous expansion? In the first place the very growth of population and industry forces an increase in transportation by water. This is reflected in the constantly increasing demand for vessels of all types from large ocean going passenger and cargo ships for service between the East and West coasts to harbor lighters and tug boats and to lakes and river craft. Nothing can stop this expansion, gradual but nevertheless inevitable, of the merchant fleet of the United States necessary for domestic purposes. There are indications that this expansion has been quickened and that the sum total of requirements along this line will mean in itself a considerable shipbuilding activity.

There is something of much more significance in the revival of shipbuilding than this growing domestic need and that is building ships for overseas trade to all parts of the civilized world. That is the program which now is beginning to be realized in the effective operation of the merchant marine act of 1928 popularly known as the Jones-White bill. Two extremely important features of this bill only need be considered. First, the assignment of mail contracts to American steamship companies for services between ports of the United States and foreign countries. Second, the authority of the shipping board to loan to American steamship owners money at low government rate of interest up to 75 per cent of the cost of building suitable modern ships for improving and adding to these services.

Hardly ever before has an act of

The author is editor of *Marine Review*, Cleveland.

congress become so quickly effective. The list of steamship companies and annual rate of payment on mail contracts given on page 1303 of the Nov. 22 issue of IRON TRADE REVIEW, shows that the government has contracted to pay these companies nearly $12,000,000 annually for a period of ten years. These mail contracts will directly encourage new shipbuilding. Definite replacements and additions of modern up-to-date vessels must be carried out under the terms of these contracts. No less than thirty-three vessels, several of them large, passenger and cargo liners and all ocean going vessels of considerable size, must be built in American shipyards during the period of the mail contracts. In some instances building is required practically as soon as the necessary plans and specifications can be prepared and bids received.

Prospects Are Bright

Thus with the expansion of our domestic shipping needs and with long period mail contracts and favorable loan provision as aids to the upbuilding of our overseas merchant marine the immediate shipbuilding prospects are exceptionally good. An enumeration of specific instances of contracts placed and contemplated shows that the effect has already begun to be felt. The American South African line has received a loan to aid in the construction of a 9400 deadweight ton combination passenger and cargo vessel of 13 knots speed. The contract for the building of this vessel has been let to the Sun Shipbuilding & Dry Dock Co. The propulsive power will be two diesel engines. The Grace Steamship Co. has been given a loan for the building of an 18-knot passenger and cargo liner to operate between New York, the Panama Canal and ports of Peru and Chile. A contract for the building of this vessel with turbine electric drive, has been awarded to the New York Shipbuilding Co., Camden, N. J.

Early in November bids were received by the Export Steamship Corp. for the building of four passenger and cargo vessels for the New York Mediterranean service. The bids received show that each vessel will cost approximately $2,250,000 or a total of at least $10,000,000. The construction of four rather elaborate automobile ferries is under consideration for service on Puget Sound. Plans have been completed for the construction of two 26,000-ton passenger and cargo liners for the service between San Francisco and Australia. The Matson Navigation Co. is the owner and operator of this line and will place the order for these two vessels within a comparatively short period of time. These vessels are to have a speed of 20 knots and accomodations for 730 passengers. Each vessel will cost $6,500,000 or more and will be the largest merchant vessels ever contracted for in an American shipyard. Under present plans these two vessels should be in commission before October, 1931.

That the merchant marine act of 1928 has had a marked stimulating effect on inquiries for new ship construction is very evident. But the full effect of the beneficial provisions of the law upon new construction will not be reached for another year. A loan has been allowed and work at the Newport News Shipbuilding & Dry Dock Co. has already begun on the third vessel, a sister ship of the S. S. CALIFORNIA and S. S. VIRGINIA, for the Panama Pacific line of the International Mercantile Marine Co. Other loan projects are in the course of negotiation, which involve the building of seven vessels. The projects commenced and in hand, though quite encouraging, are but a fraction of the number expected to be put forward during the next year or two.

Need for Increased Navy

In addition to the merchant shipbuilding now giving greater promise than at any other time with the exception of the war period, there is a very definite need without engaging in naval competition for a greatly enlarged naval building program. Our overseas possessions and our growing commerce makes it necessary to have an adequate cruiser fleet. In fact, the whole program proposed in detail by the secretary of the navy definitely recommends the building of a large number of ships to round out and to bring our navy up to a proper strength. Congress, of course, will have to act on the recommendations of the administration. The chances at the present time are very good for a program of naval building which will materially help to improve the status of shipbuilding and which will in itself call for vast quantities of material.

Shipbuilding, a quiescent industry little noticed, is going through a period of rapid reawakening and it will be worth while to study its needs and requirements because it will unquestionably be in the market for quantities of material in such amounts as to make it a factor of importance.

The foundry cupola was patented by John Wilkinson in 1794.

Steel Taking Major Role in Airplane Building

(*Concluded from Page* 1493)

must be considered, are the so-called "stainless irons" and "stainless steels." Many of the former are susceptible to heat treatment and develop excellent physical properties which with their corrosion resistance property make their use promising. Some grades of stainless iron are weldable and can be drawn and handled satisfactorily from a production standpoint.

Aluminum and aluminum alloys, especially duralumin and certain casting alloys are used extensively and will not easily be displaced by steel in the manufacture of such parts requiring lightness combined with rigidity and strength. Castings having a lynite composition have given good service and have the advantage over steel in that steel cannot be cast in such thin sections as to produce the same strength for an equal weight. Duralumin is sometimes used in conjunction with steel for such parts as ribs where the parts are not severely stressed and when so used is riveted to the steel members.

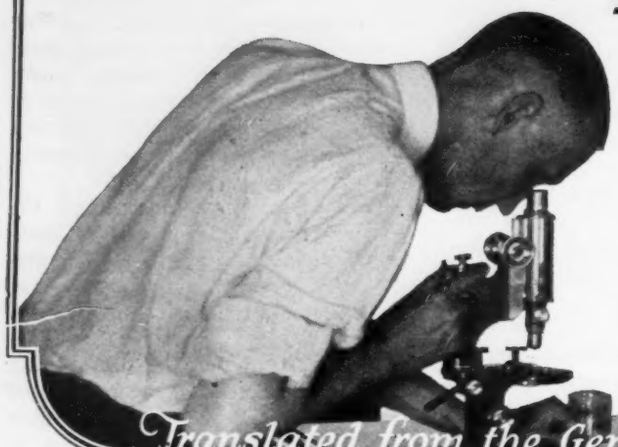
For protection from corrosion, steel parts may be electroplated with zinc or, preferably, with cadmium and excellent resistance is obtained. Alumium alloy parts require more expensive treatments which may or may not be satisfactory. Although it is true that many all duralumin planes have been built and are now in service, their protection except in the most favorable conditions has been largely experimental.

The steel tonnage used in airplane engines and structures is not impressive, but the steel is mostly of high quality and the market value is more significant. It is estimated that the demand for 1929 will approximate $1,000,000 dollars which does not include structural steel for airport uses.

Arc Welding Pictured in Industrial Film

Application of electric arc welding to the fabrication and erection of the structural steel for the recently completed Upper Carnegie building, Cleveland, is portrayed in a motion picture produced by the Lincoln Electric Co., Cleveland. Many new and unique features of construction which were described in the Nov. 22 issue of IRON TRADE REVIEW, are incorporated in this film. The motion picture is contained in three reels of 16-millimeter film. It is offered gratis for showing upon application to the Lincoln Electric Co., Coit road and Kirby avenue, Cleveland.

Metallography Simplified for Practical Use In Shop



By
E. Preuss
G. Berndt
M. v. Schwarz

Translated from the German by Richard Rimbach

Chap. VIII—Forging of Steel (Concluded)

FROM the equilibrium diagram we see immediately that with increasing carbon content the amount of ferrite must decrease and that of the pearlite increase. This is shown clearly in Figs. 83 and 84 which represent respectively steels with 0.4 and 0.55 per cent carbon. A difference in the behavior of the alloys with 0.6-0.9 per cent carbon as compared with those of a lower carbon content exists only insofar as the gamma iron transforms in them directly into the magnetic alpha iron; hence the beta iron does not occur. All this we see from the equilibrium diagram. The critical points Ar_2 in cooling and Ac_2 in heating, therefore, do not exist here, so that the critical point located on the curve OS, Figs. 79 and 80, also is called A_{3-2}.

Hardened Steel Is Next

IN THIS chapter, just concluded, the authors explain in simple language the structural changes which take place in steel when it is forged. Numerous photomicrographs are presented to illustrate the type of structures encountered in steels of various carbon contents. In the next chapter, to appear in the Dec. 27 issue of IRON TRADE REVIEW, *the important subject of hardened steel will be discussed with particular attention given to case hardening.*

It should be mentioned also that while the position of the critical A_3 is lowered more and more with increasing carbon content, A_2 remains constant at 768 degrees Cent., for alloys from 0 to 0.6 per cent carbon.

The eutectoid alloy of 0.9 per cent carbon, of course, shows only pearlite in the section, as can be seen from Fig. 85. A trace of ferrite still can be seen in the lower part of the illustration, because the carbon content was not exactly 0.9 per cent. As we know from the lead-antimony alloys with 13 per cent antimony, this alloy has only one critical point at 721 degrees Cent., which logically is called the A_{3-2-1} point. While the critical point Ac_2 coincides with Ar_2, Ac_3 lies about 8 degrees higher than Ar_3 and Ac_1 nearly 20 degrees higher than Ar_1.

In heating, the corresponding transformations take place in the opposite

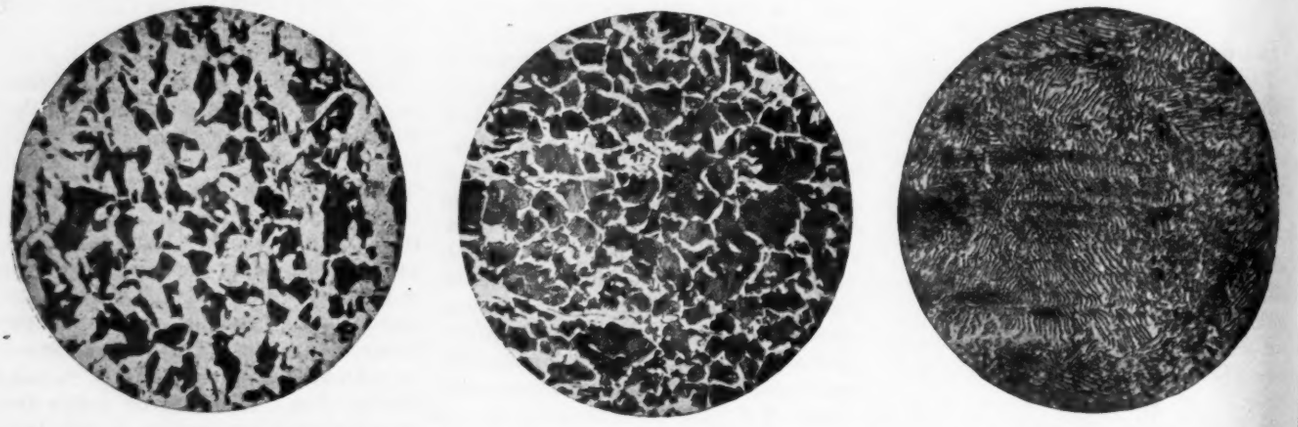
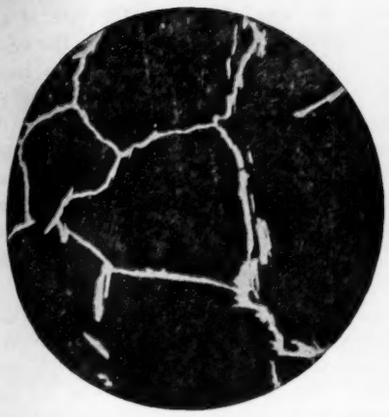
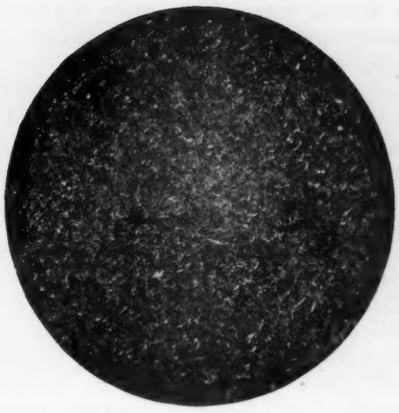


Fig. 83 (Left)—Steel with 0.4 per cent carbon; structure is ferrite and pearlite. Fig. 84 (Center)—Steel with 0.55 per cent carbon; structure is ferrite and pearlite with pearlite predominating. Fig. 85 (Right)—Steel with approximately 0.9 per cent carbon; structure is pearlite. All samples etched microscopically. X 75





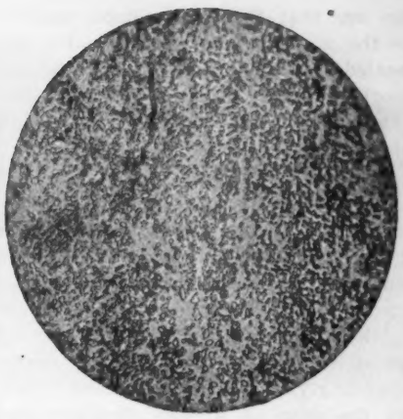


Fig. 86 (*Left*)—*Steel with* 1.0 *per cent carbon; structure is pearlite with cementite network. X* 75. *Fig.* 87 (*Center*)—*Iron with* 1.7 *per cent carbon; structure is pearlite with cementite islands. X* 75. *Fig.* 88 (*Right*)—*Granular pearlite. X* 450. *All samples etched microscopically*

direction, so that after passing above the eutectoid horizontal PK the pearlite again transforms into austenite. Reaching the critical point Ac_2 at 768 degrees, the magnetic alpha iron transforms into the nonmagnetic modification, beta iron. This applies to alloys with up to 0.6 per cent carbon.

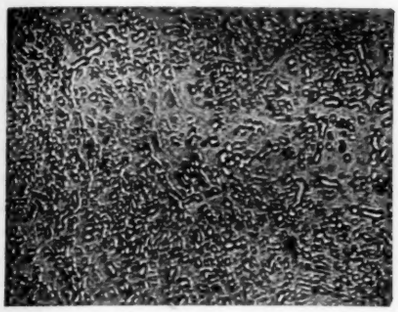


Fig. 89—*Granular pearlite in eutectoid steel. Etched microscopically. X* 300

After reaching the Ac_3 point this beta iron transforms into the gamma iron, which again immediately forms the solid solution of austenite with the available iron carbide. After reaching the solidus line AE the melting finally begins, is not finished until the liquidus line AC is reached.

If we select now a hyper-eutectoid alloy with about 1.25 per cent carbon, then the cooling proceeds uniformily up to the critical point on the curve SE after the precipitation of the solid solution, formed in the area II, Figs. 79 and 80, which is finished at the intersection of the 1.25 per cent ordinate with the solidus line AE. Here, instead of ferrite, cementite is precipitated, while at the same time the carbon content of the austenite with lowering temperature decreases along ES, until the eutectoid point S is reached. At the temperature of 721 degrees Cent. this austenite again precipitates as pearlite, so that the structure of alloys with more than 0.9 per cent carbon consists of cementite and pearlite, in such a way that with increasing carbon content the amount of cementite increases and that of the pearlite decreases. The cementite occurs either in the form of a network as in Fig. 86, steel with 1 per cent carbon, or in round globules, as in Fig. 87, steel with 1.7 per cent carbon.

It should be mentioned also that the pearlite[13] does not always occur in lamellar form as in Fig. 85. In the case of a long annealing at a temperature just below the Ar_1 point or by repeated heating above and cooling below 721 degrees Cent. it transforms into another form, that of spheroidized pearlite shown in Figs. 88 and 89.

Fig. 90—*Steel needle scratch in material of Fig.* 86. *Cementite is not scratched*

This, therefore is considered as the more stable form of the pearlite. A steel with spheroidized pearlite has a lower strength, and consequently a much greater elongation; thus the steel is soft and extremely tough. From this

[13]H. Hanemann and F. Morawe, *Stahl und Eisen*, Vol. 33, Page 1350; also W. Schneider and H. Eicken, Materials Report No. 31, March 20, 1923.

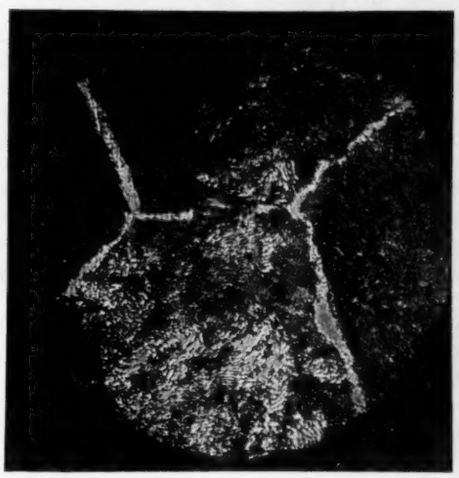


Fig. 91 (*Left*)—*Structure of area F at point* d *of Fig* 55; *ferrite and pearlite. Carbon content about* 0.25 *per cent. Fig.* 92 (*Right*)—*Structure of area P at point* 8 *of Fig.* 55; *ferrite and pearlite. Carbon content about* 0.9 *per cent. Samples etched microscopically. X* 350

we see that the spheroidized pearlite is the most suitable structure for annealed tool steel both for mechanical working with cutting tools and for cold working, for example cold-rolling strip steel for razors, etc.

In annealed steel up to 1.7 per cent carbon, the carbon content can be estimated from the micrograph, as has been explained in Chap. VII. To avoid false conclusions on account of local differences, it is advisable to work with as low a magnification as possible in order to obtain a correspondingly large field of observation. In the case of fibrous structure one section parallel and one perpendicular to the direction of rolling always should be investigated. A certain precaution must be taken, especially if the composition of the iron alloy is unknown, since the proportion of ferrite to pearlite or that of pearlite to cementite is influenced by the manganese content; in such cases the carbon content often is estimated too high. The presence of chromium[14] has a similar action. A certain difficulty also arises in the determination of whether the alloy in question is a hypo-eutectoid or a hyper-eutectoid alloy, as both ferrite and cementite show bright in comparison with the dark pearlite.

[14]A. Portevin, *Stahl und Eisen*, Vol. 37, Page 721.

Scratch Reveals Constituents

An absolutely definite conclusion however can be drawn easily if the polished surface is scratched with a hardened steel needle. Referring to Fig. 90 which shows a part of Fig. 86 at higher magnification the scratch appears as a broad, bright line going from the lower left to the upper right side. It is interrupted by a bright almost horizontal vein which proves to be cementite, since the soft ferrite would have been scratched by the steel needle while the hard cementite was not. Another characteristic of cementite is the dark color which it assumes in a solution of boiling sodium picrate.

An example may be cited to show that fairly good estimations of the carbon content can be obtained. In Fig. 55 was shown a fracture of a broken propeller blade, where the zone P seems to be darker than the zone F. The photomicrograph of zone F now is shown in Fig. 91 and zone P in Fig. 92. We see immediately, that Fig. 91 has a carbon content of about 0.2-0.3 per cent, Fig. 92 however of nearly 0.9 per cent, a fact established by a chemical analysis which was made of each zone.

It should be mentioned that the carbon content of the ferrite is always zero, that of the cementite is 6.67 per cent and that of the pearlite 0.9 per cent; furthermore that of the austenite may vary from 0 to 1.7 per cent and corresponds in field IV, Figs. 79 and 80, always to the carbon content of the original melt. Once more we point out that the steel must be annealed first if the carbon content is to be estimated from the micrograph. In overheated steel and steel cooled too fast after casting the carbon content easily is estimated too high. After a proper annealing the structure is homogenized and the estimate carried out is reliable.

Power Transmission Body Is Making Progress

THAT the Power Transmission association is making progress in accomplishing the aims in mind when the body was organized two years ago was indicated by developments at its annual convention at the Hotel Commodore, New York, Dec. 6. W. H. Fisher, T. B. Woods Sons Co., Chambersburg, Pa., in his address as president, declared the activities of this body have created an "atmosphere that is inspiring the consideration of transmission problems in a manner more unbiased than has prevailed in the past."

"It should be borne in mind constantly," said Mr. Fisher, "that we are not organized to combat or fight electric driving, but to direct our efforts to honestly develop and promote the use of our own products by advocating the right drive for given insatllations."

Members Contribute Generously

W. S. Hays, executive secretary, reported the association has accomplished more in relation to its actual expenditures than any other association with which he is familiar. Members contributed to the association advertising in trade and business papers during the past year that cost more than $125,000. That the work of the association is producing results appears to be indicated by the fact that its members, on the average, showed a gain of 20 per cent in business over the first 10 months of 1928, compared with the corresponding portion of 1927.

W. W. French, Dodge Mfg. Corp., Mishawaka, Ind., chairman of the merchandising advisory committee, reported that 35,000 copies of the association "Drive Right" booklet had been distributed to engineers and users of transmission equipment. He also reported that two regional meetings had been held during the past year, at Philadelphia and at Chicago.

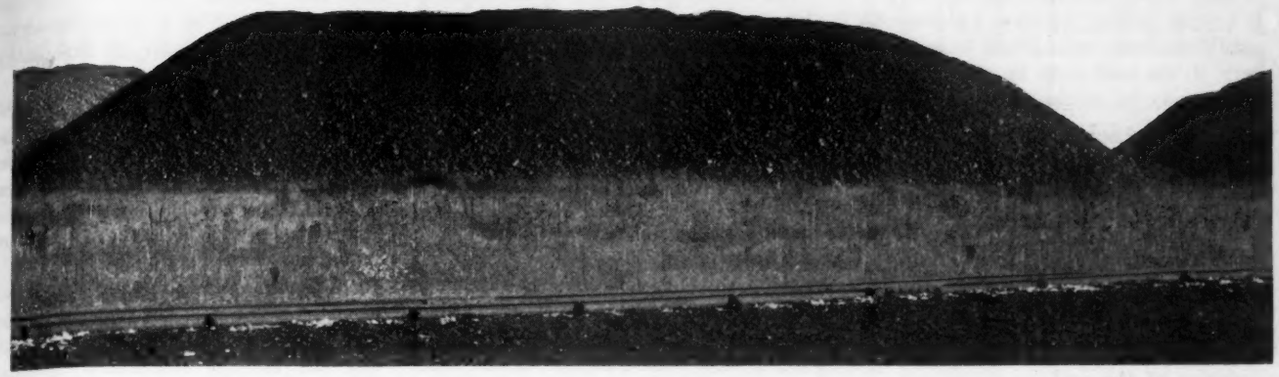
Various decisions were reached at a meeting of the board of directors following the association's open meeting. It was decided that more regional meetings would be held during the coming year and that attendance of engineers and users of transmission equipment would be invited. Such meetings are expected to be held at Boston, Chicago, St. Louis and New York. A principal point of discussion will concern a practical method for rendering service that will enable users of transmission equipment to obtain best results. Whether field representatives will be appointed by the association will be determined largely by the expressions at these regional meetings.

The directors voted to have representation by the Power Transmission association on the mechanical standards advisory council. The various groups of manufacturers comprising the membership of the association are being advised that tariff hearings will be conducted at Washington during January and February and that adequate representation in the interest of the transmission industry should be made at that time. The directors referred to the board of advisory engineers of the association a request that the National Electrical Manufacturers association be urged to develop a method of testing alignment of shafting and motors.

Advisory Engineers Report

William Staniar, chairman of the association's board of advisory engineers presented a long report. Its most important feature was a reference to a 400-page book on "Mechanical Power Transmission," written by Mr. Staniar and recently published. Mr. Staniar called attention to numerous articles on the subject of transmitting power that had been published in various business and trade papers the past year. Mr. Staniar recommended that members of the association consult his committee more freely with reference to problems in connection with power transmission.

A. E. Pyott, Pyott Foundry Co., Chicago, was elected a director, representing the pulley division. Directors whose terms expired were re-elected.



Bituminous coal piled carelessly with no regard to safe practice offers a serious fire hazard. Regular inspection is imperative

Coal Storage Requires Special Attention To Avoid Fires

Bituminous Fuel Is Constant Hazard Unless Properly Piled, Ventilated and Drained—Frequent Observation Necessary To Detect Heat Development

By A. T. Ward

FOR many reasons, the safe storing of bituminous coal for the average plant is something of a problem, thus the purpose of this article will be to describe the usual storage method and to suggest certain precautions for safeguarding the stored fuel against spontaneous combustion.

The reasons for storing coal are various. One plant, a considerable distance from the coal fields, will store considerable quantities because of possible interruptions to transportation, especially during the winter season. Another coal user, such as a by-product coke plant, will require a special grade of coal, the production of which is not capable of ready expansion when a greater load is thrown upon the ovens, consequently stocks must be depended upon to supply the excess of requirements over expected production and steady shipment of coal. An industry having "captive" mines finds that by storing coal in the summer months at the points of consumption, it can operate its mines at full capacity and efficiency the year round. Still another class of coal consumers—and larger consumers, too—supplies an indispensable service to the public, and it is a first necessity to carry heavy stocks in order that there may be no chance of interruption resulting in a clamor from the public. Then there is the industrial coal user who takes advantage of the constantly recurring periods when satisfactory coals may be secured at bargains. Some of this coal may be consumed currently, but the rest will go into stock piles. Finally, there are a few public-spirited buyers who will stock coal during the periods of low production in the summer months with the idea of helping to remove the valley in the curve of production at the mines.

Vast Quantities Stored

For these and other important reasons, coal must be stored in quantity by the average industrial consumer, and the aggregate of this storage will vary from 40 tons to 70 million tons, depending upon current industrial conditions, the industrial outlook, and the situation as to production in the coal fields of the country.

In general, there are two classes of consumers which store coal—the large consumer, who handles enough coal to make it feasible and profitable to install equipment for a special plant layout, wherein all safeguarding measures are built in, so to speak, and the smaller consumer, for whom coal is only one of the raw materials entering into the scheme of plant production, and for whom the installation of special equipment for the handling and storage of coal would be inexpedient and uneconomical. Numerically, the latter class far outnumbers the former, and it is to this class that this article is directed.

The customary method of storage is to unload the coal from the carrier directly into or upon the place of storage, usually in the open air. Once stored, this coal is seldom disturbed until an emergency arises—when the coal is required for consumption or when the stock pile is cleaned-up, a sort of tidying-up operation, in the words of Henry Ford. Since the building-up of this stock pile is generally done only periodically, there are usually no hands in the plant expert in the technique of coal storage; ordinary changes in plant personnel would almost preclude such a condition, so that the storing of coal usually is done with the limited supervision and with small attempt at taking the necessary precautions against the hazards of spontaneous combustion. In other words, the coal is usually stored in a more or less routine manner and then forgotten until needed, provided nothing happens in the way of fires in the meantime.

As a result of several recent investigations as to correct methods of

The author, A. T. Ward, is general manager, Coal Specialties Co., 50 Church street, New York.

storing coals and the causes of fires in stock piles, certain fundamental conditions have been found to be necessary if the coal is to be stored safely. These may be enumerated as follows:

1. General Location—Well away from main buildings of the plant. Under no circumstances pile against a frame building. Do not store near external sources of heat.
2. Ground or Floor—The coal should be placed upon a well-drained, level and unventilated surface of a firm nature. Avoid the use of a cinder bottom because it will permit the entrance of air and consequent oxidation of the coal.
3. Height—Limit to 15 feet if possible.
4. Time of Storage—Any time except in extremely hot weather.
5. Precautions Against Spontaneous Combustion—See section following.
6. Distribution of Coal in the Pile—Place in layers, lumps and fines evenly. If wet coal is received, it should be dumped around the edges of the pile or in some location where the air can get at it freely and where large quantities of other coal will not be packed on top of it.
7. Surface Exposed—Keep this as small as possible.
8. Maintenance of Storage—Do not disturb the coal after it is stored unless it is desired to withdraw it for consumption.
9. Inspection—This should be done regularly to observe evidences of heating.
10. Heating—When heat develops, the area should be immediately ventilated and the hot coal removed and consumed or spread out for cooling.

The fundamental conditions outlined above approach what might be termed perfect practice; usually in the average plant there must be numerous variations as to the general location of the storage pile, the ground or floor upon which the coal will rest, and in the height of the pile.

In most older plants, now in well-built-up areas, the coal cars are usually run up and over a wooden trestle, the hoppers opened and the coal discharged to the ground, filling up the spaces between the wooden supports of the trestle almost to the level of the track when no other space is available.

Practice Invites Combustion

This practice violates the important rule of avoiding the contact of coal with wooden members, a prolific source of causes of spontaneous combustion. Aside from this dangerous contact of coal with wood, the crevices around the wooden supports generally permit the circulation of air and cause a concentration of the flow of rain water at the surfaces of contact, which further increases the liability of spontaneous combustion. Nor are wooden supports the only causes of such heating activity, even the contact with iron or concrete posts will accelerate the heating of the coal.

In such cases, the value of the damage to portions of the coal pile which may become overheated is insignificant in comparison with the value of the damage to the trestle structure itself, and the proper protection of this structure should be a prime consideration even if the value of the coal is to be left out of consideration.

Furthermore, the height of the reserve coal storage cannot always be kept within safe limits if security of plant operation is vital, so that the safety of the coal pile must often be subordinated to this other and more important consideration.

In the matter of the ground or floor, there have been cases where firm, dry ground was selected. But, with the storage space near a water front, the rise and fall of the tide causes a "breathing" through the coal pile, resulting in numerous fires.

It is evident, therfore, that with the average industrial plant, exceptions to the rules of safe coal storage practice must be regarded as being almost inevitable due to plant conditions. The sensible thing is to make as few exceptions as possible.

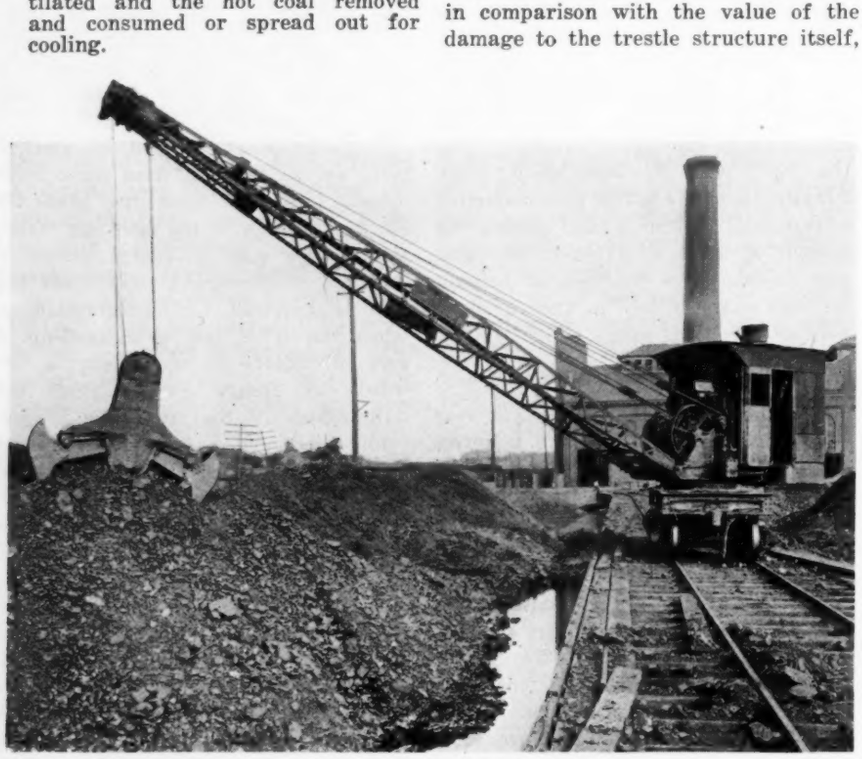
Fresh-mined coal when placed in storage undergoes a chemical change which is commonly termed weathering. This change is in effect a form oxidation, due to the fact that when the coal is piled, more or less air is trapped in the interstices between the particles of coal. The greatest portion of the weathering occurs in from six to ten weeks after storage.

While this oxidation is taking place, the coal has a tendency to heat. As long as the temperature does not exceed 125 degrees Fahr. no danger of ignition of the coal exists. While in some instances a temperature as high as 140 degrees Fahr. has been observed without ignition, it has been found that in no case on reaching 150 degrees Fahr. has the temperature receded. Therefore, 150 degrees Fahr. represents the critical temperature or danger point, and from here on any increase in temperature may be expected to develop rapidly to the ignition point.

In the case of coals used in the coking process, however, while the critical temperature for ignition still remains at 150 degrees Fahr. it has been found that when a temperature of 110 degrees Fahr. is exceeded, the coking properties of the coal are materially altered, hence it is necessary either to consume the coal or to provide suitable ventilation at once.

During the weathering process, the dangerous heating generally occurs between 2 and 10 feet, usually 6 feet, from the surface and seldom deeper than 10 feet. Spontaneous heating and combustion so-called might be termed accelerated oxidation due to local conditions prevailing in certain portions of the coal pile where a bal-

(*Concluded on Page* 1506)



This shows how coal often is piled in an unsafe manner. Adequate handling machinery is available, but the storage ground is poorly drained as is indicated by the pools of water. Moisture accelerates spontaneous combustion

Engineers Hold Record Meeting

Attendance at Forty-ninth Annual Convention of Mechanical Engineers Exceeds Totals of All Previous Years

Elmer A. Sperry Becomes New President—Julian Kennedy Gets A.S.M.E. Medal for Services to Steel Industry

AGAIN the halls of the engineering society's building, New York, were crowded with engineers from all over the country as the forty-ninth annual convention of the American Society of Mechanical Engineers got under way Dec. 3-7. The meeting was the largest in point of attendance of any in the society's history. There were 29 technical sessions, and a large number of important papers. The registration reached 2525 members and guests. Last year it was 2350 and the year before 2212. The policy initiated last year of having fewer papers and more discussion was followed out this year, and the result was a large number of written discussions of papers submitted.

Suggestions for improvement in mechanical equipment and in handling of material were of special interest. Dr. Elmer A. Sperry was elected president. The American Society of Mechanical Engineers medal was awarded Julius Kennedy, Pittsburgh. Other awards went to M. D. Aisenstein, Robert M. Meyer and Clarence C. Franck. Both the Holley medal and the Melville medal were not awarded this year. Dr. Wheeler F. Davey, Pennsylvania State College, gave the Robert Henry Thurston lecture Thursday.

Need for Improved Equipment Stressed

THE importance of modern materials handling methods in the development of industry was forcibly impressed during the week's meetings. The modern plant has eliminated its storage department. Material comes in on cars at one side, goes from there directly to process and the finished product is **delivered** to cars at the other side of the plant.

Passenger air travel in this country will soon show a growth comparable with that of air mail in the past, according to the report of the aeronautic division, presented at the opening session on Monday. Interest in airport construction has increased to the extent that most of the larger cities have at least some kind of a flying field. The outstanding feature in the development of aircraft engines is the great number of engines both in quantity and new type produced for non-military activities during the year.

Management Based on Fact

W. L. Conrad, consulting engineer, New York, who headed the management division, said that modern management was based on fact rather than on theory or tradition. Manufacturers today must be waste-conscious in order to succeed. The utilization of formerly wasted products is increasing. The railroad equipment manufacturers, according to the report of the railroad division, are confronted with a serious economic problem due to the tremendous fluctuation in the volume of orders. Equipment manufacturers hardly know what to do to arrange for a curtailed output, fearing that extreme demands will be made on their plants at most any time in the future, and that diversion of capacity to other fields will greatly handicap operations in that event.

New Officers

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

President

ELMER A. SPERRY
Chairman of the board of directors, Sperry Gyroscope Co., Brooklyn, N. Y.

Vice Presidents

WILLIAM ELMER
Specification engineer, Pennsylvania Railroad Co., Philadelphia

ROBERT L. DAUGHERTY
Professor of mechanical and hydraulic engineering, California Institute of Technology, Pasadena, Calif.

CHARLES E. GORTON
Chairman, administrative council, American Uniform Boiler Law society, New York

Managers

CHARLES M. ALLEN
Professor of hydraulic engineering Worcester Polytechnic institute, Worcester, Mass.

ELY C. HUTCHINSON
President, Pelton Water Wheel Co., San Francisco

ROBERT M. GATES
Manager, industrial division, Superheater Co., New York

Treasurer

*ERIK OBERG
Editor, *Machinery*, New York

Secretary

*CALVIN W. RICE
29 West Thirty-ninth street, New York

*Re-elected.

The railroads now have 35 per cent less passenger business than eight years ago, and since 1920 the freight business has increased an average of less than 1 per cent a year, compared to an increase of over 5 per cent a year previous to the war.

Alex Dow, president, Detroit Edison Co., Detroit, and retiring president of the society, presided at the morning and afternoon sessions Monday, and delivered the annual presidential address Tuesday night. He predicted a great future for the profession of mechanical engineering and for the American Society of Mechanical Engineers.

New Type of Technical Education

Industry today is recruiting an army of non-college workers intensively trained for direct action in posts which university graduates leave unfilled, according to Robert H. Spahr, New York, who spoke on education and training for industry on Tuesday. As a result of this, a new type of technical education is starting in this country. It is more advanced in character than high or trade school training and it differs from that usually known as trade education. In Great Britain more than 150 institutions offer this kind of training.

Tuesday night honorary memberships were awarded to Mortimer E. Cooley, former dean of engineering school, University of Michigan, and successor to Herbert Hoover, as president of American Engineering coun-

cil, and to Ira N. Hollis former president, Worcester Polytechnic Institute, Worcester, Mass.

Speakers before the management division voiced the need of a nation wide survey of industry to determine how far machinery is outworn. L. P. Alford, vice president, American Engineering council, New York, speaking at this session said engineers should press the war on waste, inaugurated by Herbert Hoover, when he became president of the American Engineering council ten years ago. Considerable data was given in the report of Mr. Alford and J. E. Hannum, New York, concerning the connection between low manufacturing costs and high wages. It appears from this report that certain industries are caught in a vicious cycle of low wages and inefficiency. Reference to this report was made on Page 1440 of the Dec. 6 issue of IRON TRADE REVIEW. A summary of it will appear in an early issue.

Discusses Antifriction Bearings

A lively discussion on the use of antifriction bearings in steel mills developed at the Friday morning session of the iron and steel division. George T. Snyder, chief engineer, Lorain works, National Tube Co., Lorain, O., presented the progress report of the division. A paper entitled, "Heavy-Duty Antifriction Bearings" was presented by Sidney G. Koon, associate editor, the *Iron Age*, New York. Mr. Johnson, chief engineer, United Engineering & Foundry Co., Pittsburgh, in opening the discussion, said that steel mills were inclined to use too small rolls. He attributed many of the failures of antifriction bearings to this cause. Another common cause, he said, is the lack of uniform heat treatment of the rolls and races. Frequently a bearing will be cracked by the application of a sudden load. Dirt in bearings is a contributing cause to their failure, but Mr. Johnson felt that proper lubrication would counteract nearly all ordinary dirt trouble.

S. M. Weckstein, industrial equipment engineer, Timken Roller Bearing Co., Canton, O., said that the initial cost of antifriction bearings might be less than plain bearings, due to the large amount of hand scraping necessary in adjusting large heavy-duty plain bearings. He described a new large tube mill now being built for his company's plant at Canton, O., which will be completely equipped with roller bearings. The speaker stated his company was making exhaustive tests on many types of mills and would have a report at some future meeting.

H. A. S. Howarth, general manager and chief engineer, Kingsbury Machine Works Inc., Philadelphia, stated a properly designed plain bearing operates without metal contact and many times with less friction than the antifriction bearing. Plain bearings have greater friction at the start before the film of oil is established. This friction rapidly drops away and is less than antifriction bearings up to about 100 revolutions a minute for a 20-inch diameter bearing. Above this point the friction increases with the plain bearing, but the oil film is maintained and there is no upper limit as to service.

Practical Problems Cited

A steel mill operator told of a plain bearing installation which had been giving trouble. A new grease system was designed and this made the bearing operation highly satisfactory. Alvan L. Davis, research engineer, Scovill Mfg. Co., Waterbury, Conn., said that he had operated a small roll between the jaws of a large testing machine, and in this way developed much interesting data on strain on bearings.

A representative of Skayef Ball Bearing Co., Hartford, Conn., mentioned that in all fairness to the plain bearing it had suffered from development by nonexperts, where antifriction bearings had been developed by friends. The difficulty of too little space between rolls for an antifriction bearing usually can be overcome by using larger rolls. The power required does not increase much with increase in diameter on an antifriction bearing, although it does on a plain bearing.

Materials Handling Problems Face Industry

PROGRESS in material handling was discussed Tuesday afternoon at which time a comprehensive progress report was presented by C. B. Crockett, Society for Electrical Development Inc., New York. Much room for improvement exists in the realm of materials handling, according to Mr. Crockett. The labor of handling material has increased per unit as against the labor required for processing per unit and this despite the great strides made in the development of handling equipment. As examples of this development, the speaker described a new car dumper which has a capacity of one 70-ton car per minute, or 4200 tons per hour. A new 2-cubic yard shovel has been designed with demountable caterpillar treads making rail shipments possible without disassembling.

The less than carload container principle has been modified for use on marine shipments. Large cranes of special design now transfer fully loaded refrigerator cars from the dock to the hold of the vessel, the process being reversed upon the arrival of the vessel at destination. The development in crane design has been towards greater hook and travel speed, lighter steel construction due to welding and more exact control.

Dignity of Science Not Attained

M. W. Potts, secretary, materials handling division, in discussing Mr. Crockett's paper, said that materials handling could not claim the dignity of a science as yet. The industry needs more men devoting their entire time to materials handling. Definite facts are needed. The load factor and power factor are poor with most handling equipment. Electrical companies who have studied conveyors find that nearly all are over motorized. Too large a motor not only means higher investment cost than necessary but a continual increased cost for power. Mr. Potts suggested the standardization of parts of handling equipment and also emphasized the importance of lubrication. He said that usually handling equipment is abused in this latter respect, whereas process equipment is by the nature of things well taken care of. Mr. McLain in a short review of the work of the division presented as its retiring chairman said he felt the division should become a clearing house for information on material handling problems. A vast amount of data should be available and he requested co-operation in this.

E. W. Clark, Clark Tructractor Co., said that in all the preceding discussions he had heard little about gas trucks. In a survey made by his company it was shown that nearly 80 per cent of all common labor in industry is engaged in handling materials. This is a great drain on industry and a handicap in its further development unless improvements in handling methods are adopted.

The continuance of the United States in its enviable position in world industry depends upon the

elimination of labor in material handling, according to Mr. Clark. Improvements in line of labor reduction are only a part of the possibilities of better handling methods. Quick turnover of stock means low inventory. At present it is often as expensive to move material through a plant as it is to move it from its original source to the plant.

Motor Ratings Too High

Francis E. Blake, assistant engineer, New York State public works, Albany, N. Y., confirmed the previous remarks about too high motor rating on material handling equipment. He said he had found cases on conveyor belts where a 150-horsepower motor had been installed and where a 100-horsepower motor could take care of the maximum load. He said he found several cases where conveyor belt speeds were too high for efficient operation from the point of view of power required. It often happens that a conveyor belt will carry more material than the next link in the sequence in which case no tonnage is lost in the overall handling if the belt speed is reduced.

Mason A. Stone, designing engineer, E. L. Phillips & Co., N. Y., discussed the question of cost and cost saving in connection with materials handling equipment. He described plants where overhead had been reduced by nearly 50 per cent by making the process sequence automatic. It is not enough, he said, to know that so many men were eliminated by a piece of handling mechanism. In addition we must know the changes in overhead and overall costs.

In reply to the discussion, Mr. Crockett said that quick turnover was undoubtedly one of the most important phases of the materials handling problem. He cited the case of the Packard Motor Car Co., Detroit, where thousands of men are working with three days' raw material on hand. The modern plant, he said, aims to have no storage whatever, but to take the materials from cars at one side of the plant, process it and ship it out to cars at the other side. By eliminating its storage the Packard Motor Co. has released an enormous amount of space for active production processes. Another company by cutting out its storage of raw materials eliminated from its payroll 150 men formerly engaged as stock chasers.

Other Papers Presented

J. R. Shea, superintendent, manufacturing development, Western Electric Co., Chicago, gave an illustrated talk on new manufacturing equipment before the management section.

Robert T. Kent, manager, engineering and sales, Divine Brothers Co., Utica, N. Y., presented a paper on the executive function in industry, in which he told of the importance of men, money and material in the success of any manufacturing enterprise. He said that the budget only becomes of value as it was used, and he drew diagrams to illustrate a simple method of picturing actual progress compared with budget estimates.

New Alloy May Affect Machine Tool Design

ONE of the liveliest discussions in the machine shop practice division meetings centered around the subject of tungsten-carbide tools. Dr. Samuel L. Hoyt, research laboratory, General Electric Co., Schenectady, N. Y., presented a paper describing the use of this new tool alloy. The material is extremely hard and its use opens up a promising field in machining materials which do not exert great presure on tools.

Dr. Hoyt described a dozen or more tests in which tungsten-carbide was used successfully as a cutting tool. In most of these tests the speed of production was increased by more than 100 per cent over previous practice.

Will Affect Tool Design

The general opinion expressed in discussion was that the importance of the new tungsten-carbide alloys in relation to machine tool design and future manufacturing practice is difficult to exaggerate. E. F. DuBrul, manager, National Machine Tool Builders association, Cincinnati, said that the new tool alloys deserve the serious consideration of all machine tool builders. He reviewed the slow progress made in machine design adjustment at the time high-speed steel was first introduced. Progress in that respect was by cut and try methods.

Continuing the discussion, he recommended a well organized research program which might be carried on jointly by machine tool manufacturers, machine tool users and manufacturers of hard tool alloys. He suggested that an experimental research fund amounting to as much as $500,000 might be necessary. While such a sum seems large, in reality it is small in comparison with the revolutionary effect which may be expected on industry as a whole. In such an investigation he said that the user has the greatest stake and therefore should carry the bulk of the expense. The user, he said, always gets more profit out of a new tool development than does the tool builder.

According to Mr. DuBrul, this whole subject suggests the possibilities of the National Machine Tool Builders association employing a consulting designer, just as the association now employs a consulting cost accountant. Tool builders should welcome the advent of new materials, according to one builder who discussed Dr. Hoyt's paper. The increase in cutting speed of a tool is so important to the user of tools that it forces him to discard the slower equipment even though recently purchased.

Other Possibilities Considered

Other points brought up in this discussion of tungsten-carbide tools were: Possibility of cutting chromium plated parts; advance in bearing design in machine tool construction which makes it possible to build equipment more than equal to the needs of the new hard alloys; use of the material for dressing grinding wheels; use of a revolving multiple cutting tool equipped with chromium-carbide cutting edges to offset the light cut recommended.

Awards Are Made

AS IS customary at annual meetings of the American Society of Mechanical Engineers, several awards were made at the meeting in New York last week.

The A. S. M. E. Medal was awarded to Julian Kennedy, consulting engineer, Pittsburgh, for his services and contributions to the iron and steel industry. The Charles T. Main award was presented to Robert M. Moyer, Newark College of Engineering, for his paper, "Scientific Management and Its Effect on Manufacturing." The Junior award was given to M. D. Aisenstein, Byron Jackson Pump Mfg. Co., Berkeley, Calif., for his paper, "A New Method of Separating the Hydraulic Losses in a Centrifugal Pump." A student award was made to Clarence C. Franck, Johns Hopkins university, Baltimore, for his paper, "Conditions, Curves and Reheat Factors for Steam Turbines."

Power and Engineering Exposition Attracts Widespread Interest

MORE diversified products and larger exhibit space than ever before made the seventh annual Exposition of Power and Mechanical Engineering at Grand Central Palace, New York, last week, the greatest yet staged. Exhibitors totaling 577 showed products from nearly every state and from several foreign countries. The exhibit is becoming more and more a national educational feature. As proof of this, more than 30 universities and technical schools sent entire classes to the power show this year. Princeton university was represented by more than 100. Stevens institute by more than 150, and some students came from as far west as the University of Southern California.

New Products Displayed

Several entirely new products were exhibited this year. One of these was the tungsten-carbide alloy, composed of tungsten, carbide and cobalt. The fields covered by the exhibit are too many to enumerate. Boilers, stokers, refractory and furnace construction products, recording and control instruments, piping, valves and similar power equipment were prominent. Next in prominence perhaps came ball and roller bearings, gear reducers and chains of all varieties.

As was evident last year, plant equipment assumed great importance at the show this year. Manufacturers of standard machine tools are gradually withdrawing from the power show, and the space thus vacated is being more than made up by specialty tools and equipment of all sorts. The exhibits this year were nearly all characterized by elaborate preparation and display features. The booth of the Grinell Co., Providence, R.. I., was a case in point. This booth was surrounded by a high pipe framework supporting dozens of flood light devices, which made products exhibited stand out in great prominence.

About half of the exhibits showed processes in actual operations and where this was impractical, moving pictures or illuminated diagrams were frequently used. Motion pictures were effectively used in other exhibits.

A unique feature of the show this year was International Day, for which occasion interpreters were supplied by different colleges, and by this means Japanese engineers present were able to talk to Brazilians and Katsutoshi Takeda, engineer from China, was able to converse with a representative of an engineering interest in Australia.

Charles M. Schwab, chairman of the board, Bethlehem Steel Corp., New York, sent the following telegram:

"My heartiest congratulations on the opening of the seventh annual Exhibition of Power and Mechanical Engineering. The progress that has been made each year in this all important field makes this a significant event in the industrial development of the nation. Living in an age of rapid change, we are becoming yearly more dependent on engineering and the scientific skill in harnessing power for great construction purposes. Exhibitions such as this help to disseminate knowledge of mechanical advancement for the benefit and inspiration of those who are engaged in the engineering profession.

"In the remarkable progress of the last half century engineering and industry have gone hand in hand. We could never have attained our position of leadership if this were not so. The machine and mechanized power have given, and are giving, greater capacity to our industries. To the public they have meant savings in cost and better quality. To the workers they have meant high wages and more leisure. Machinery has liberated us from drudgery and waste, has opened up undreamed of opportunities and enriched our standards of living. Let me wish you every success not only in your exhibition, but in the progress of the great industry which this enterprise represents."

Meters, control devices and measuring equipment were extensively exhibited. This year, as last, the Tinius Olson Testing Machine Co., Philadelphia, had an exhibit which attracted much attention. This year the equipment included means whereby finished parts can be tested for hardness over the entire surface.

Under the general heading of pipes, fittings, valves and traps were the exhibits of E. B. Badger & Sons Co., Boston; Barco Mfg. Co., Chicago; Bartlett Hayward Co., Baltimore; William E. Williams Valve Corp., New York; Westco-Chippewa Pump Co., Davenport, Iowa; Templeton Steam Trap Co., New York; Stockholm Pipe & Fittings Co., Birmingham, Ala.; Sarco Co., New York; Nash Engineering Co., South Norwalk, Conn.; Grinell Co., Providence, R. I.; Dri-Steam Valve Sales Corp., New York; Julian d'Este Co., Boston, and others.

Chains and chain applications included Morse Chain Co., Ithaca, N. Y.; Ramsey Chain Co., Albany, N. Y.; Baldwin Chain & Mfg. Co., Worcester, Mass., and Yale & Towne Mfg. Co., Stamford, Conn. Unishear Co. Inc. showed its full line of sheet cutting machines, including a portable motor driven tool weighing 6½ pounds. The General Electric Co.'s booth attracted much attention with its atomic hydrogen welding. In the booth of the Carboloy Co., New York, actual production tests were carried on with the new tungsten-carbide tool alloy.

Many interesting products were exhibited by the manufacturers of refractories. These companies included General Refractories Co., Philadelphia; E. J. Lavino & Co., Philadelphia; Refractory & Engineering Corp., New York, and Quigley Furnace Specialties Co. Inc., New York. Blaw-Knox Co., Pittsburgh, had an interesting exhibit of forged steel grating in addition to clam shell buckets and other items. Another exhibit of steel gratings was shown by the Tri-Lok Co., Pittsburgh. A new speed reduction gear which was unusually quiet and vibrationless was shown by the Crocker-Wheeler Electric Mfg. Co. Inc., Ampere, N. J.

Shows Die Cast Glass

Special types of die cast gears were shown in actual operation by the Doehler Die Casting Co., Batavia, N. Y. Some of the special gears shown in this exhibit are difficult to produce by cutting. Many types of perforated metal and many uses of this material and of steel grating were shown by the Hendrick Mfg. Co., Carbondale, Pa. A type of steel net flooring and a new method of reinforcing concrete slabs were shown by the Irving Iron Works Co., Long Island City, N. Y.

The International Nickel Co., New York, showed many interesting nickel and monel metal parts for power plant use. Landis Machine Co. Inc., Waynesboro, Pa., exhibited pipe cutting and threading machines in operation. Exhibits of shears and punches were offered by Henry Pels & Co., New York. and by David H. Smith & Son, Brooklyn.

Announces Technical Program for Western Metal Congress

WORD has been received that Dr. Kotara Honda, professor of metallurgy, Tohoku Imperial university, Sendai, Japan, will attend the First Western Metal congress to be held at the Hotel Biltmore, Los Angeles, Jan. 14-18, to deliver a paper before the Wednesday afternoon technical session. Dr. Honda is being dispatched to the convention by the Japanese government as the result of an invitation extended to the Japanese minister of education by the American Society for Steel Treating under whose auspices the congress is being arranged.

Dr. Honda, who is recognized as one of the world's greatest metallurgists, has made many trips to America and his coming again in January is awaited with interest for it is understood that he will report on some of his recent investigations. He is an honorary member of the American Society for Steel Treating.

Several other eminent members of various technical societies will participate in the program. Representatives of 14 engineering societies, covering the mechanical, mining, metallurgical, petroleum, welding, automotive, electrical, gas, marine and foundry fields are co-operating in arranging the program.

Concurrent with the congress, a Western States Metal and Machinery exposition will be held in the Shrine auditorium. The greater part of the space available has been reserved and assigned.

Morning sessions of the congress will be held at the Biltmore hotel and afternoon sessions at the Shrine auditorium. The tentative program is given below.

40 Papers Scheduled for Los Angeles Meeting

Monday, Jan. 14

MORNING

"Importance of Shops in University Training," by Arthur B. Domonoske, executive head, mechanical engineering department, Stanford university, Stanford University, Calif.

"Gear Manufacturing Including Heat Treatment," by F. A. Brooks, chief engineer, Johnson Gear Co., Berkeley, Calif.

"Investigation of Fatigue Resistance of Eutectoid Carbon Steel When Drawn at Different Temperatures," by Mr. Watson, metallurgist, Regan Forge Co., San Pedro, Calif.

"Heat Treatment of Dies, Tools and Gears," by Jordan Korp, Leeds & Northrup Co., Philadelphia.

AFTERNOON

Foundry division program sponsored by the Metal Trades and Manufacturers association

"Special Nickel Castings," by Paul D. Merica, assistant manager, International Nickel Co., New York.

"Sand Testing Equipment and Demonstration," by A. A. Grubb, Mansfield, O., and member of the sand testing committee of the American Foundrymen's association.

"Nickel-Chrome Alloy Iron," by W. R. Shimer, metallurgical engineer, Bethlehem Steel Corp., Bethlehem, Pa.

"Heat Treatment of Carbon and Alloy Steel Castings," by J. E. Donnellan, secretary, recommended practice committee of the American Society for Steel Treating, Cleveland.

"Furnaces," by R. E. Talley, president, George J. Hagan Co., Pittsburgh.

Tuesday, Jan. 15

MORNING

"Selecting Metals and Alloys for Severe Services Involving Corrosion, Erosion and Heat Resistance, with Particular Reference to Oil Refinery Conditions." Speaker unannounced.

"Valves and Fittings in the Oil Refinery, the Materials Used in Their Construction, Their Design and Application in Particular Services, and High-Pressure Oil Conveying and High-Pressure Gas Distribution." Speaker unannounced.

"Tendency Toward Higher Steam Pressures in Both Marine and Stationary Services, the Materials Available for the Construction of Boilers for These Higher Pressures, and Some of the Factors Involved in Their Design," by Robert L. Daugherty, professor of mechanical engineering, California Institute of Technology, Pasadena, Calif.

"Heat, Insulation and Insulation Materials, Their Properties and Their Applicability for Particular Conditions Met with in Furnace Design, Industrial and Marine Boiler Services, and Services in the Chemical Industries Involving Corrosive Conditions Combined with High Temperatures." Speaker unannounced.

AFTERNOON

American Society of Mechanical Engineers will conduct a symposium of five papers on the manufacture of oil field specialties.

"Tool Joints," by E. W. Goesor, Emsco Derrick & Equipment Co., Los Angeles.

"Cast Steel Slush Pump Cylinders," by Lester Keim, Oil Well Supply Co., of California.

"Kellys, or Grief Stems," by E. W. Timbs, National Supply Co., Chicago.

"Sucker Rods," by W. H. Laury, Axelson Machine Co., Los Angeles.

"Heat Treated Drill Pipe," Standard Seamless Tube Co., Pittsburgh.

These five papers will be rather similar in the method in which the material is organized, touching chiefly upon the service to which they are subjected, the raw material used, together with its physical property, the forging and heat treating of same, and the gaging and control of production.

Wednesday, Jan. 16

MORNING

American Petroleum Institute, California Division of Development and Production Engineering.

"Sucker Rod Strains and Stresses," by F. W. Lake, Union Oil Co., Los Angeles.

"Drill Pipe Failures," by Ben Stroud, National Tube Co., Pittsburgh.

"Casing Failures," by K. V. King, Standard Oil Co. of California.

"Welding and High-Pressure Gas Distribution," by C. J. Coberly, Kobe Inc.

AFTERNOON

American Institute of Mining and Metallurgical Engineers.

"On the Double Diagram of the Iron-Carbon System," by Dr. Kotara Honda, professor of metallography, Tohoku Imperial university, Sendai, Japan.

"Proposed Metallurgical Control for Small Heat Treating Plants," by Dr. Welton J. Crook, professor of metallurgy, Stanford university, Stanford, Calif.

"Electroplating and the Uses of Copper in Machinery." Speaker unannounced.

"Heat Treatment of Gears," by W. H. Phillips, vice president, Molybdenum Corp. of America, Pittsburgh.

Convention Calendar

Jan. 14-18—American Society for Steel Treating. Western Metal congress and Western States Metal and Machinery exposition at Shrine Auditorium, Los Angeles. W. H. Eisenman, Shrine auditorium, Los Angeles, manager.

Jan. 14-18—American Engineering council. Annual meeting in Washington. L. W. Wallace, 26 Jackson place, Washington, is secretary.

Thursday, Jan. 17

MORNING

Pacific Coast Gas Association.

"Gas and Electricity as Heat Mediums," by F. W. Manker, vice president, Surface Combustion Co., Toledo, O.

"Heat Treating Furnace Design," by J. H. Gumz, industrial engineer, Pacific Gas & Electric Corp., San Francisco.

"Existing Heat Treating Installations," by E. M. DeReamer, industrial engineer, Southern California Gas Co., Los Angeles.

"Gas as Applied to Carburizing," by Robert G. Guthrie, metallurgist, Peoples Gas Light & Coke Co., Chicago.

AFTERNOON

Pacific Coast Electrical Association.

Address by Paul Downing, vice president, Pacific Gas & Electric Corp., and president, Pacific Coast Electrical association.

"Electric Heat as Applied to Industry," by C. L. Ipsen, consulting and designing engineer, industrial heating and welding department, General Electric Co., Schenectady, N. Y.

"Design as Applied to Arc-Welded Construction," by Gilbert D. Fish, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Friday, Jan. 18

MORNING

Society of Automotive Engineers.

"Manufacture and Heat Treatment of Automobile Leaf Springs," by J. B. Rauen, general manager, U. S. Spring Co., Los Angeles.

"Production of Nickel Steel Castings by Electric Furnace Method," by E. Favary, consulting engineer, Moreland Motor Truck Co., Los Angeles.

"Aluminum as Applied to the Automotive and Airplane Industries," by Dr. Zay Jeffries, chief research engineer, Aluminum Co. of America, Cleveland.

"Some Phases of Aircraft Construction." Speaker unannounced.

"Metallurgical and Heat Treating Problems in Motor Car Manufacture," by J. M. Watson, chief metallurgist, Hupp Motor Car Co., Detroit.

AFTERNOON

American Welding Society, American Society of Civil Engineers, American Institute of Electrical Engineers and the American Institute of Architects will participate in this session.

"The Welding of Steel Buildings and Bridges," by Dr. Frank P. McKibben, consulting engineer, General Electric Co., Schenectady, N. Y.

"Heat Treatment with Oxyacetylene Flame," by J. J. Bruton, service engineer, Oxweld Acetylene Co., New York.

"Building Machinery with Arc-Welded Steel," by David Hall, district engineer, Westinghouse Electric & Mfg. Co., Los Angeles.

Cold Storage Demands Special Attention

(*Concluded from Page* 1500)

ance is struck between insufficient air and an excess of air, and its cause may be due to one of the many factors entering into the problem of coal storage.

All coal is subject to this phenomonon, and more money is lost from fires due to this cause than is generally known or admitted. Hundreds of instances have been found in which destructive heating and actual fires were progressing without visible evidence and without knowledge of officials or engineers in charge.

Some of the causes of spontaneous heating are as follows:

1. Contact with foreign substances accidentally or otherwise entering into the coal pile, such as wood, paper, blasting fuse, dry or oily rags, etc., all of which ignite at temperatures lower than coal.
2. Certain constituents of the coal itself—the natural charcoal or "mother" of coal, particularly a constituent of Indiana coals, which serves as a tinder and for which there is no practical method of elimination. Pyrite has some influence; it oxidizes to sulphuric acid which in contact with water gives rise to a considerable increase in temperature. It also splits the coal particles and so exposes more surface to oxidation. Coal fairly high in volatile matter such as lignites, sub-bituminous, bituminous, and semibituminous coals are especially susceptible to heating. The contact of fresh-mined coals with older, seasoned coals also acts as tinder to the point of contact.
3. Leakage of air around poles or pipes, etc., to the pile, is a cause of heating.
4. The catalytic effect of moisture will produce heating and alternate wetting and drying of the coal will accelerate heating.

Oftentimes, when fires are discovered, it is found that the entire coal pipe is affected and a large portion of the coal actually consumed. Aside, from following the rules of good practice in storing coal and in taking such measures as we have noted as being helpful in reducing spontaneous heating from causes other than weathering, this fact is apparent: Easy and positive control is possible only through frequent observation and the detection of heat development in its incipient stage. This observation and detection of dangerous heat development should be followed by the prompt removal of the hot coal for immediate consumption or through ventilation. This is the only safe and practical means of arresting spontaneous combustion.

Safety Trophy Miniature Bessemer Converter

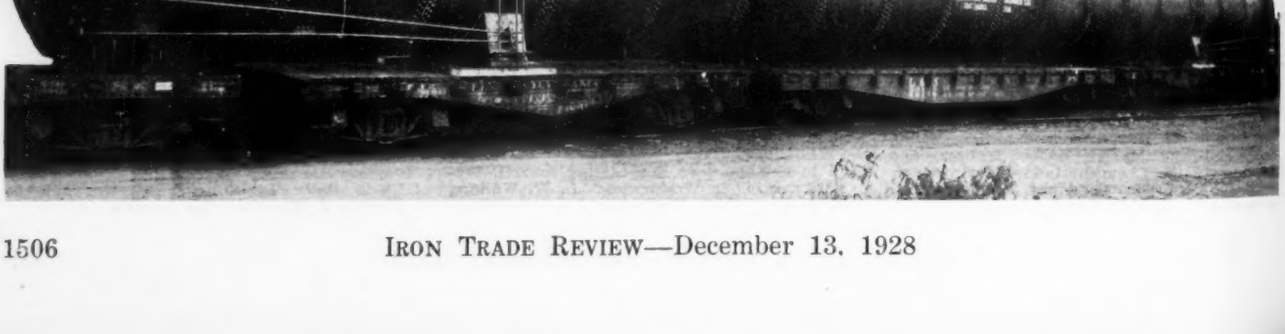
Each year the Carnegie Steel Co. puts into competition among its plants a safety trophy, and that for 1929, illustrated, is the eighth in the series. It is an actual bessemer converter in miniature, fashioned after a converter at one of the company's plants.

The converter, supports and accessories of sterling silver, rest on a bronze plinth oblong in form, 25 x 34 inches, bearing silver shields designed to carry the names of the monthly winners. Beneath the figure on the front of the composition appears the name of the company cast in the bronze, and a larger shield or plate which will carry the name of the winner in perpetuum at the end of the year.

Long Steel Drum Requires Unusual Handling

AN UNUSUALLY large steel drum to be used for pressure creosoting recently was fabricated by the Hedges-Walsh-Deidener to the Gulf States Creosoting Co. The shell is 140 feet long, 8 feet in diameter and has a plate thickness of 1 inch. This is believed to be the largest steel drum ever shipped as a completely assembled unit. It weighs between 150 and 200 tons and is shown in the accompanying illustration loaded on five flat cars ready for shipment. The drum is composed of seventeen sections of steel plate which have been strongly riveted together. Exceptional manufacturing facilities of the Hedges-Walsh-Weidner Co. at Chattanooga permit the manufacture of steel drums for pressure up to 2000 pounds and of any length that can be handled and shipped.

Another interesting shipment recently made from this plant was a car tank for nitric acid, the first nitric acid car tank to be built in this country. This tank was 6 feet 1½ inches inside diameter and 31 feet 9 inches long. The top two-thirds of the shell was of 5/16-inch steel, the bottom of 7/16-inch steel and the heads were made of 9/16-inch steel. This tank has a capacity of 7000 gallons and is the first of seven stainless steel tanks to be built for the E. I. Dupont De Nemours & Co.



Editorials

Iron Ore Output Lags Behind Steel

A COMPARISON of Lake Superior iron ore shipments with steel production indicates how extensively scrap has replaced ore. The total movement of ore for 1928 is approximately 54,849,774 tons. This is an increase of 5 per cent over 1927, but a decrease of 17 per cent from the highest record of a season's shipment, which was attained in 1916, as European nations began drawing on the United States for various munitions of war.

The peak of steel ingot production during the war period was reached in 1917. Estimated production for 1928 shows an increase of approximately 14 per cent over that year. Here we have a large reduction in ore consumption and at the same time a substantial increase in steel output.

The difference cannot be accounted for by imports, as the amount of ore brought to this country in 1916 was 1,325,000 tons, and since 1923 the imports have remained within limits of 2,000,000 to 2,600,000 tons annually. The amount of ore shipped from all districts in the United States outside of the Lake Superior ranges was 11,000,000 tons in 1916 and 10,198,000 in 1927, with indications the 1928 tonnage will be closer to that of 1916. Larger use of scrap can only account for the declining requirements of iron ore.

In comparing pig iron production, the 1928 estimate shows a reduction of 5 per cent from 1916. This is more in line with the drop in iron ore shipments. An exact ratio could not be expected because of variation in the amounts of iron ore carried over from one season to another, and to some extent change in quality of the ore.

The production of pig iron last year was accomplished at the rate of 540 tons a day, compared with 336 tons a day in 1916. This is due to larger capacity of the furnaces. Mining equipment also has much larger capacity, but the mines are not called on to produce as much ore as in the war period.

Despite the heavy demand for iron ore that developed late in the season, all requirements have been covered. This is indicated by the fact that shipping of ore on the lakes closed before Dec. 1, earlier than usual, and while the movement of grain, coal and general freight continued. Iron ore shipments in November this year were more than double those of the same month in 1927, and some upper lake docks set new records for continuous loading of boats.

Standard for Copper Alloys Needed

RECOGNITION by the nonferrous casting shops of the necessity for extending the fullest co-operation to the "special committee to promote general use of specifications for copper alloys," recently formed, is paramount if the work of this committee is to be pursued with the greatest facility and dispatch. Every copper and brass casting plant in this country has been, and is, confronted with a difficult problem in buying ingot brass and other copper alloys due to the diversity of specifications under which these alloys are produced. Through this special committee of the American Society for Testing Materials it is hoped to remove this problem to the limbo of things both forgotten and gone.

This cannot be done without the aid and co-operation of all interested parties, however. Indeed, the program outlined at the recent meeting of this committee is hopeless of achievement, if the support of the buyers and sellers of these alloys is not forthcoming. In view of this, and the very fact that the fruit of the effort will redound to the advantage of the industry as a whole, no producer or consumer can justify his failure to extend the fullest aid to this committee in its effort to simplify specifications and rationalize, as far as possible, the method of quoting prices now followed in this field.

Rationalization is needed in this industry. More than 1500 alloys now are produced and as no one set of specifications is followed as standard, quality of metal sold varies considerably with accompanying instability in market quotations. Only organized effort can remedy this situation and the special committee provides such means. It is entitled to complete support and fullest co-operation of all concerned in this much needed stabilization effort.

Automobile Output at New Record

AS ONE of the major consuming lines of steel materials, the automobile industry and the fluctuations of its business must always constitute a matter of deepest concern and interest to the iron and steel trade. Just now, following

a year of extraordinary production of motor cars, there is much speculation respecting the prospect for 1929. Some inherent characteristics cling to the industry, making it prone to dramatic developments. This has been particularly true of the last two years.

Early in 1927 it became evident that Ford was losing his lead. Not long afterward the production of Ford cars was suspended altogether, pending announcement of a new model. This paralyzed the entire industry with uncertainty, and contributed greatly to the slackening in general business in 1927. Late in the year the new Ford appeared but it was not until well in 1928 that production reached anything approaching normal.

Meanwhile, general business had recovered, the Ford model was no longer a mystery, and the motor car industry was faced with an overwhelming demand for cars. Production was speeded up and has continued high all year. The result is that a new record of output is assured for 1928. Currently, production has slowed down for seasonal causes.

The industry is entering 1929 geared up to produce as many as 7,000,000 cars and trucks. It is unlikely that the demand will greatly exceed 4,500,000. This means continuance of keen competition, rendered even more severe, by the fact that Ford is now aggressively in the picture. Certainly all the companies will not make all of the cars they now plan to make, but viewing the industry as a whole and a consumer of steel the prospect is for a 1929 output probably as large as in 1928. This would mean continued large demand for automobile steel regardless of competition among motor car makers. The favorable view is supported by the outlook for continued good times in this country, with the maintenance of buying power in agricultural and industrial sections, together with steady improvement in export demand.

Good Will Should Bring Good Trade

AN ANALYSIS of world markets in the annual report of the department of commerce gives striking evidence of the importance of Latin-American trade to the United States. Undoubtedly commercial interests of the United States will avail themselves of the present opportunities to develop reciprocal trade relations with South American nations.

In discussing the changes in the geographic distribution of United States exports in the last few years, Dr. Julius Klein, director of the bureau of foreign and domestic commerce, points out in the report that Europe, which has become highly developed in manufactures, still is a leading importer of foodstuffs and raw materials and that formerly the Continent was the largest buyer of United States goods by far. Although Europe has taken steadily increasing quantities of United States manufactures, the expansion, Dr. Klein shows, naturally has been far greater with the countries less developed industrially. Thus the share of Europe in United States exports has fallen to less than half. Among the continents showing the greatest gain in imports of manufactured goods from the United States has been South America. Asia, Oceania and Africa follow in importance.

It is clear that unusual opportunities await American business for trade in South America, even within the next year. The commercial opportunities are enhanced by the good will tour of Mr. Hoover. Business men of this country should avail themselves of the opportunity to back up the efforts of the government in stimulating the advancement of export markets.

Steel and Aircraft Interdependent

DEVELOPMENT of the aircraft industry in the United States is proceeding with greater rapidity than most people realize. Figures by Luther K. Bell, secretary of the Aeronautical Chamber of Commerce, an affiliation of 95 per cent of airplane manufacturers and operators, show that whereas in 1921 no commercial planes were built, in 1927 a total of 1995 were manufactured, 4000 in 1928, and the forecast for 1929 is 10,000 to 12,000 planes.

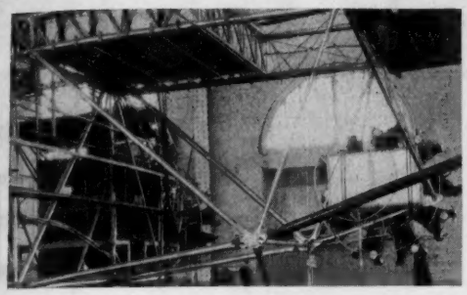
This growth is fully as rapid as that made by the automotive industry in a comparable stage of development. When it is considered that planes can be operated only after careful training of pilots, while an automobile could be driven by any intelligent person, the growth of use of aircraft is the more remarkable. Mechanical difficulties encountered in the internal combustion engine of the early automobile are not met in the same degree in the airplane, as a result of the experience of automotive engineering.

Since the automobile has developed an industry of major proportions in a quarter century the advancement of air travel at a rate doubling each year for the past three, gives promise of another major industry, closely linked by the automotive. It is of the greatest moment to the iron and steel industry, particularly in that branch devoted to the finer grades of steel. The two are interdependent to some degree and a wider market for supersteels will enlarge the opportunities for research and further improvement in the metal.

IRON TRADE REVIEW

Volume 83, Number 24 — Published Every Thursday

E. L. SHANER, Editor. — *J. D. PEASE, Advertising Director.* — *F. F. LIGHT, Circulation Manager.*



All-Metal Plane Construction Becoming Standard. Page 1491.

SHIPBUILDING in American yards is on the threshold of an era of remarkable expansion, according to A. H. Jansson, editor of *Marine Review.* The article beginning on page 1494 written by Mr. Jansson is of importance to steel producers because it is a survey of shipbuilding requirements and prospects and indicates the tonnage of steel that will be needed, and the expenditures involved. Recent inquiries for 85,000 to 90,000 tons of steel shipbuilding plates in the East are the largest that have developed in many months and forerunners of larger needs.

The Readers' Page

CONTENTS

For December 13, 1928

SPECIAL ARTICLES

Alloy Steels Assume Important Role in Aircraft Manufacture—By Edwin Joyce 1491
What Revival of Shipbuilding Means to Industry—By A. H. Jansson..... 1494
Metallography Simplified for Practical Use in Shop—Chap. VIII—By E. Preuss..... 1496
Coal Storage Requires Special Attention to Avoid Fires—By A. T. Ward 1499
Engineers Hold Record Meeting..... 1501
Power and Engineering Exposition Attracts Interest..... 1504
Western Metals Congress Announces Program..... 1505
Long Steel Drum Requires Unusual Handling..... 1506
Editorial..... 1507

BUSINESS TREND

Motor Car Outlook Favorable—By John W. Hill..... 1510

Automobile Production..... 1510
Pig Iron Situation. 1511
Blast Furnace Operating Rate..... 1511
Railroad Car Orders 1512
Freight Car Loadings..... 1512
Iron and Steel Price Index..... 1513
Interest Rates..... 1513

MARKET REPORTS

Review of Markets..... 1514
Iron, Steel Prices..... 1514, 1515, 1516, 1519, 1529, 1552

Pig Iron..... 1517
Coke..... 1518
Ferroalloys..... 1518
Nuts, Bolts, Rivets. 1518
Iron and Steel Scrap 1519
Semifinished..... 1520
Bars..... 1521
Plates..... 1521
Pipe..... 1522
Sheets..... 1523
Tin Plate..... 1523
Structural Shapes. 1524
Reinforcing Bars.. 1525
Railroad Equipment 1526
Cold Finished Steel 1527
Wire and Nails.... 1527
Strip Steel..... 1527
Nonferrous Metals 1528
Coke By-Products. 1528
Warehouse Markets 1529
Pacific Coast Markets..... 1530
Foreign Markets.. 1535
Crane Inquiry and Awards..... 1546

GENERAL NEWS

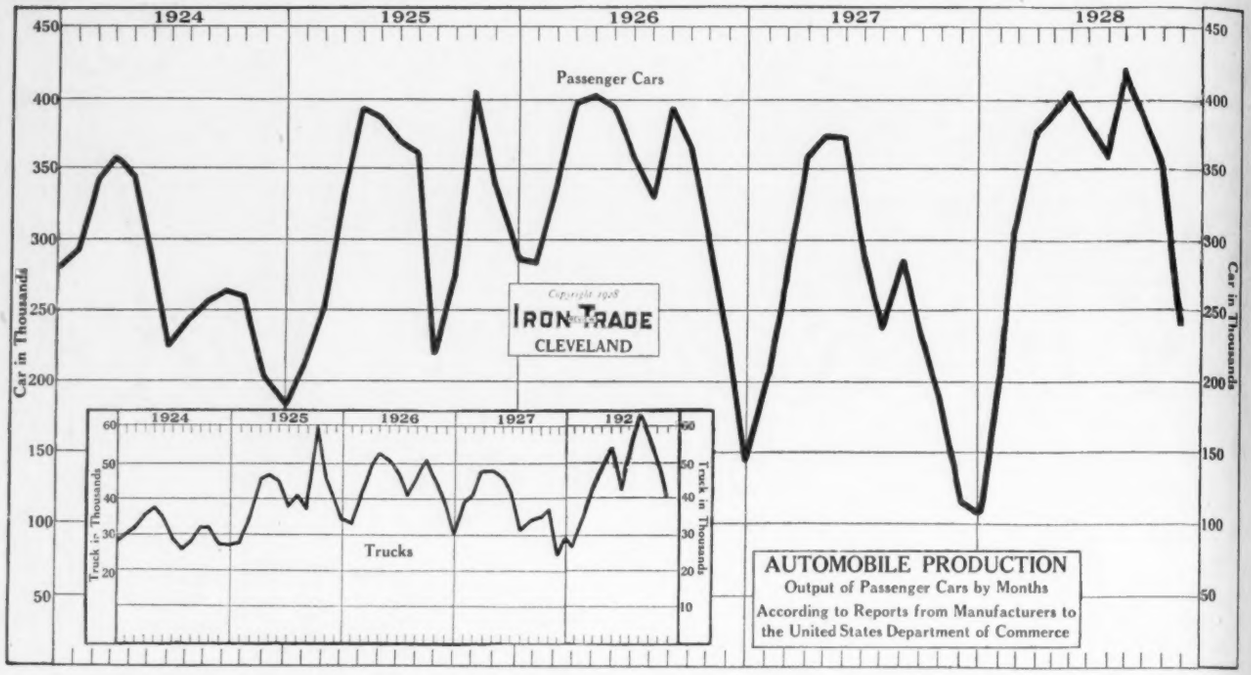
November Ingot Rate Is Down..... 1533
Taylor Society Discusses Position of Labor Organizations..... 1534
Industrial Men in the Day's News—Charles M. Fitts..... 1537
Aircraft Prospects Seem Bright..... 1540
Bethlehem Sues Corporation over Steel Mill Patents..... 1542

Men of the Industry 1538
Obituary..... 1539
Here and There in Industry..... 1541
Construction and Enterprise..... 1547
New Incorporations 1550
Trade Publications 1550

IRON TRADE REVIEW is published by the Penton Publishing Co., Cleveland, O. Member, Audit Bureau of Circulation; Associated Business Papers Inc.; and National Publishers Association. Branch offices: 1147 People's Gas Bldg., Chicago; 209 Edwards Bldg., Cincinnati; 2208-2206 No. 220 Broadway, New York; 2148-49 Oliver Bldg., Pittsburgh; 24 California street, San Francisco; 1653 Pennsylvania avenue, Washington; and Boston. Foreign offices: Prince's Chambers, Birmingham, Eng.; Caxton House, Westminster S. W. 1, London; 9 Rue de Londres, Paris, France; Wilhelmstrasse 114, Berlin, S. W. 48, Germany; Cable address: *PENTON*, Cleveland; *ITROTRAPEN*, London. Terms: Subscription in United States, Cuba and Mexico, $6 per year; in Canada, $8.50 per year and in Great Britain and other countries £2:0:0 per year. *Entered at the Postoffice at Cleveland as Second Class Matter.* *Copyright 1928 by the Penton Publishing Co.*

The A. B. P. is a nonprofit organization whose members have pledged themselves to a working code of practice in which the interests of the men of American industry, trade and professions are placed first—a code demanding unbiased editorial pages, classified and verified paid subscribers and honest advertising of dependable products

The Business Trend



Motor Car Prospects Favorable

By JOHN W. HILL, Financial Editor

THE production of automobiles declined in November in accordance with seasonal expectations. The decrease, however, left the record of output far above that of one year ago when the industry was in the throes of temporary reaction. Preliminary estimates indicate that in November the industry turned out 280,000 cars and trucks. This compares with 420,000 cars and trucks reported for October.

ONE year ago in November the production of passenger cars and trucks was 141,033. So it is seen that this year's results were practically double those of one year before. The current decline is due to inventory taking, to preparation for new models, and to the seasonal drop in demand. It may be counted a healthy indication that production has slowed down at this time of the year.

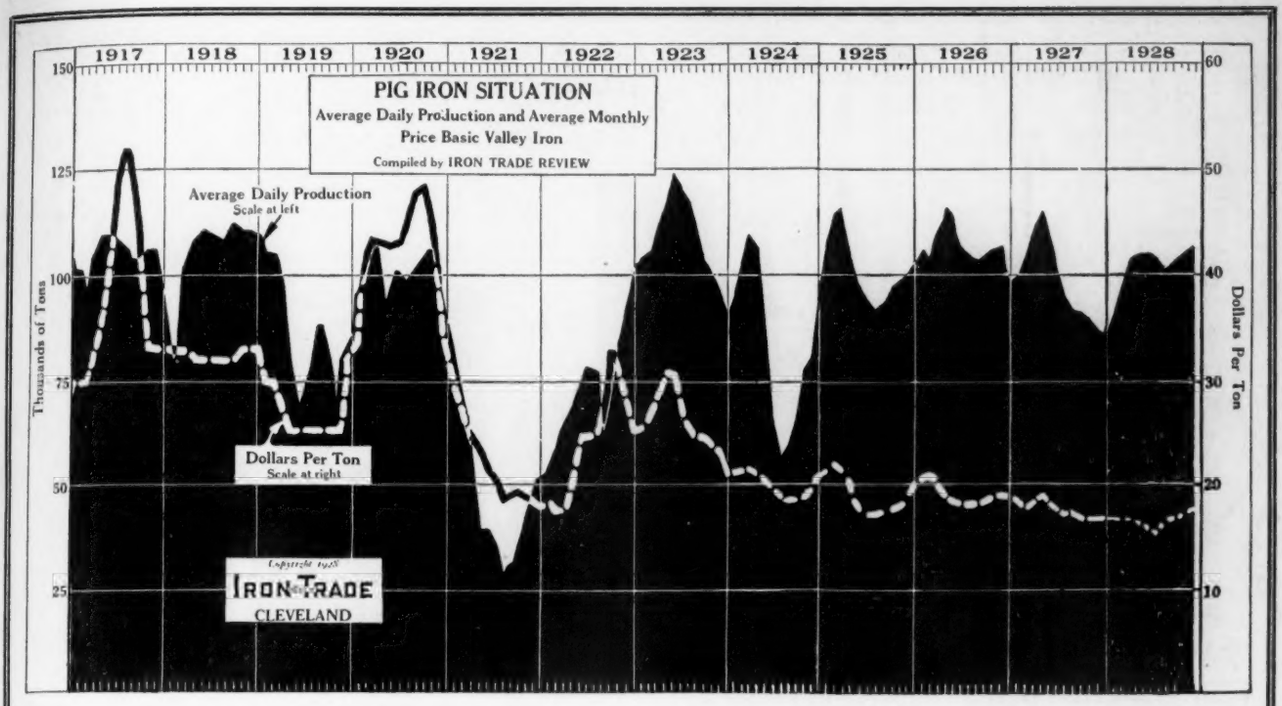
ONE of the bogies of the automobile industry is overproduction. This is the fate which has been regularly predicted for it, but which in the past rarely has overtaken it. Overproduction happened early in 1924, with the result that manufacturers determined upon a policy of holding schedules of output in line with demand.

APPARENTLY that policy has been pretty closely adhered to since that time. The present letdown is evidence that the industry is not letting production run away. The result is that from most reliable reports stocks of dealers are not excessive. In fact, until recently, dealers of some cars were behind in their deliveries.

THE outlook is that December will mark the turning point for motor car production. Inventories are being completed, new models are being brought out by many companies, and January will bring the automobile shows. The prospect is for an upturn in output which will carry forward for some months. More cars may be made in the first few months of 1929 than in any similar period.

THIS prospect, of course, forecasts severe competition in the industry. It may be even more severe this year than for some years because of Ford's aggressive come-back into the market. Probably not all companies can sell all the cars now scheduled in production, but with prospects for continuing prosperity here and abroad, the domestic and foreign demand in 1929 probably will equal or exceed that of 1928.

The Business Trend

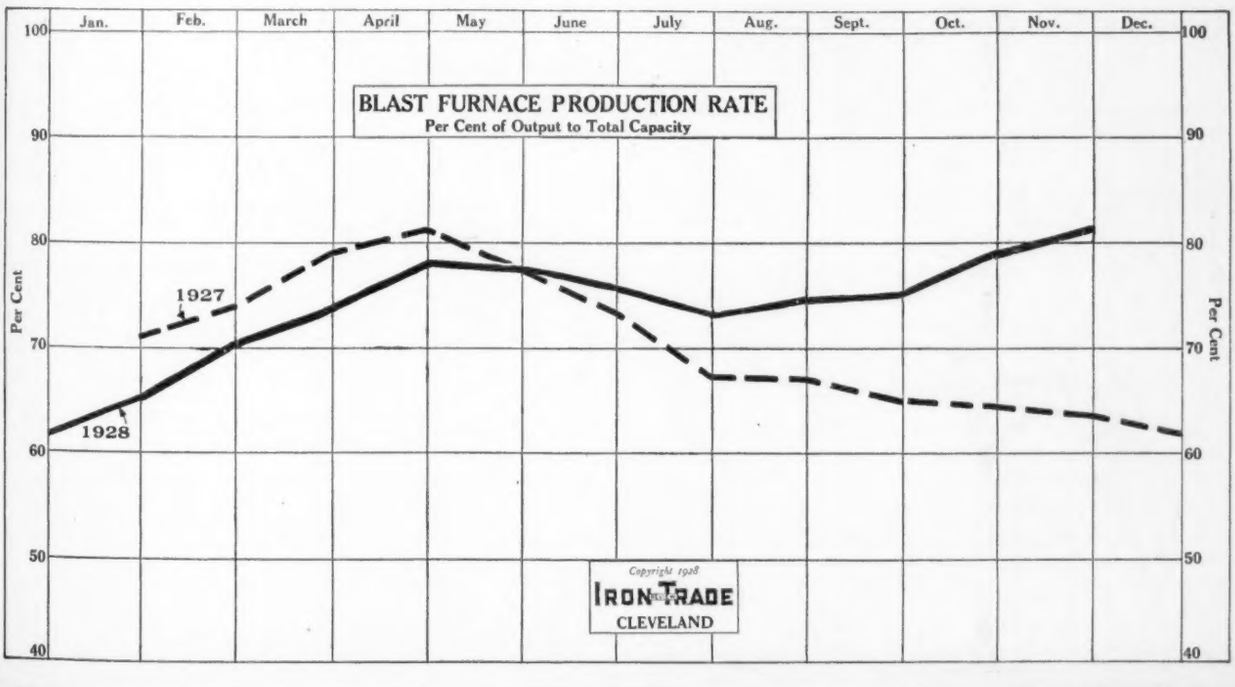


Pig Iron Situation

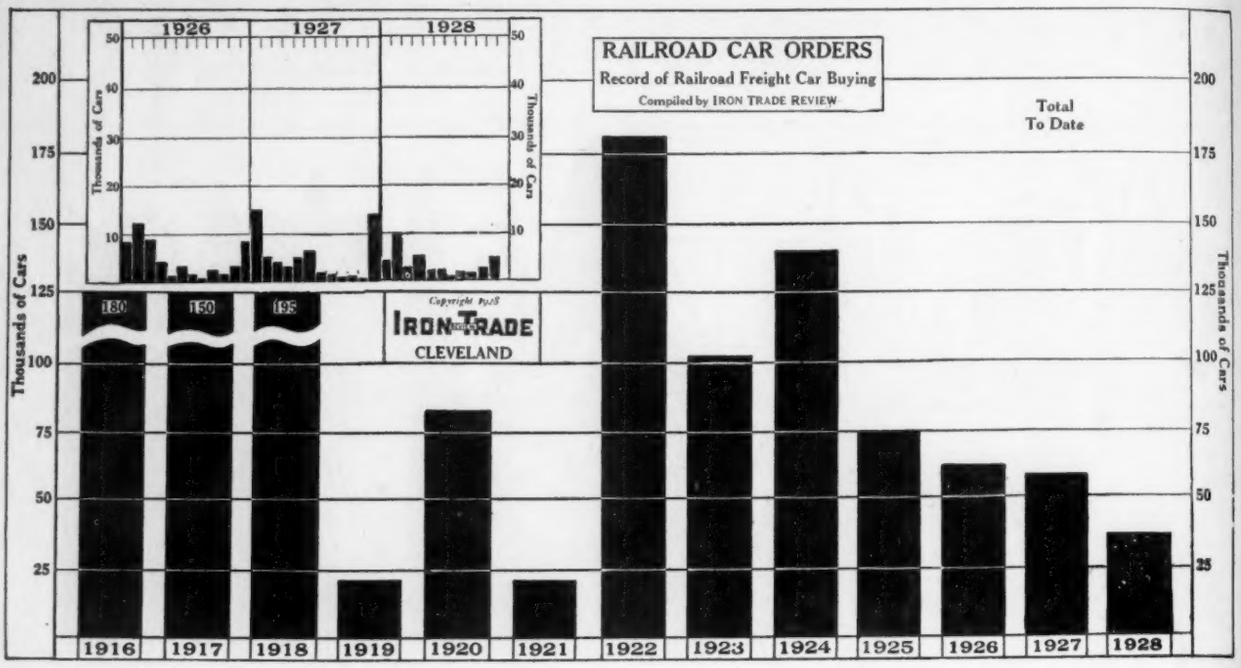
THE production of pig iron in November was the highest for any corresponding month reached since November, 1913. The daily average rate of 110,123 tons was the third highest of any November in history, the other month which exceeded it being November, 1916. The daily average was the largest for any month since April, 1927, and compared with 108,824 tons in October and 88,728 tons in November, 1927. Pig iron prices are at the best level in about 18 months.

Blast Furnace Production Rate

THE rate of operations of blast furnaces has been climbing steadily during 1928. The percentage of production to the aggregate capacity of all furnaces stood at 81.1 per cent in November compared with 80.1 per cent in October and 63 per cent in November, 1927. The capacity of furnaces is based on the estimate by the American Iron and Steel institute of 49,605,720 tons as of December 31, 1927. The recent improvement in pig iron apparently has a sound foundation and the outlook is good.



The Business Trend

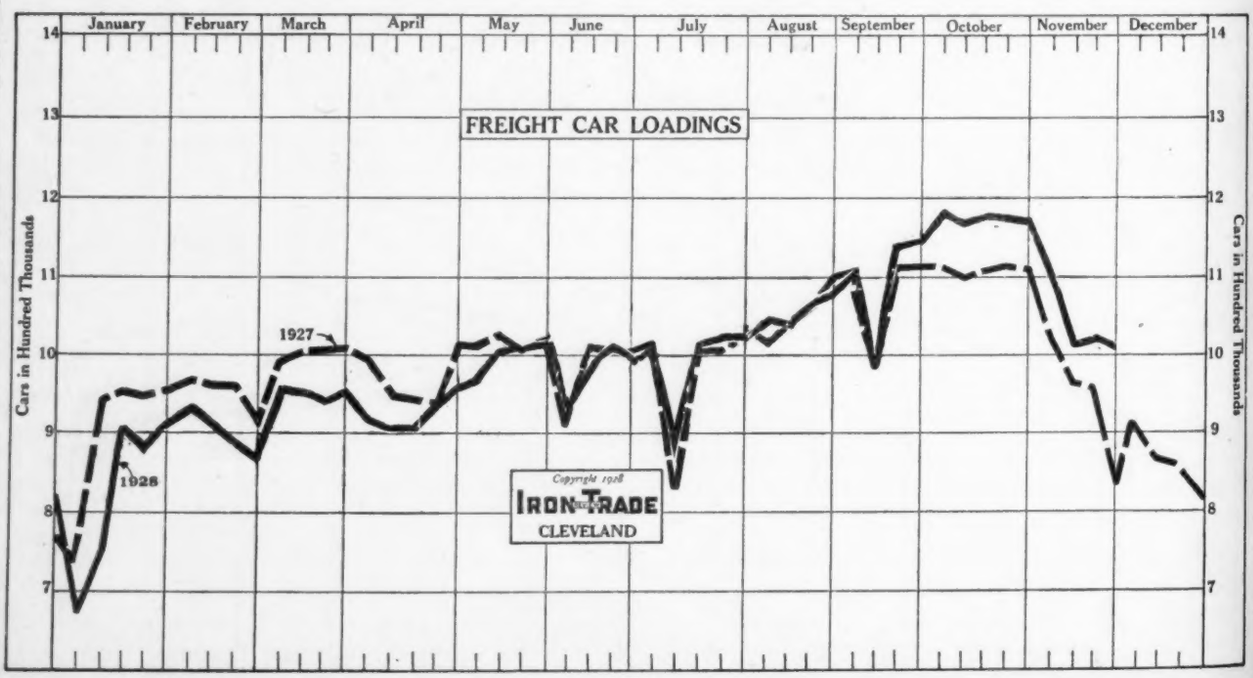


Railroad Car Orders

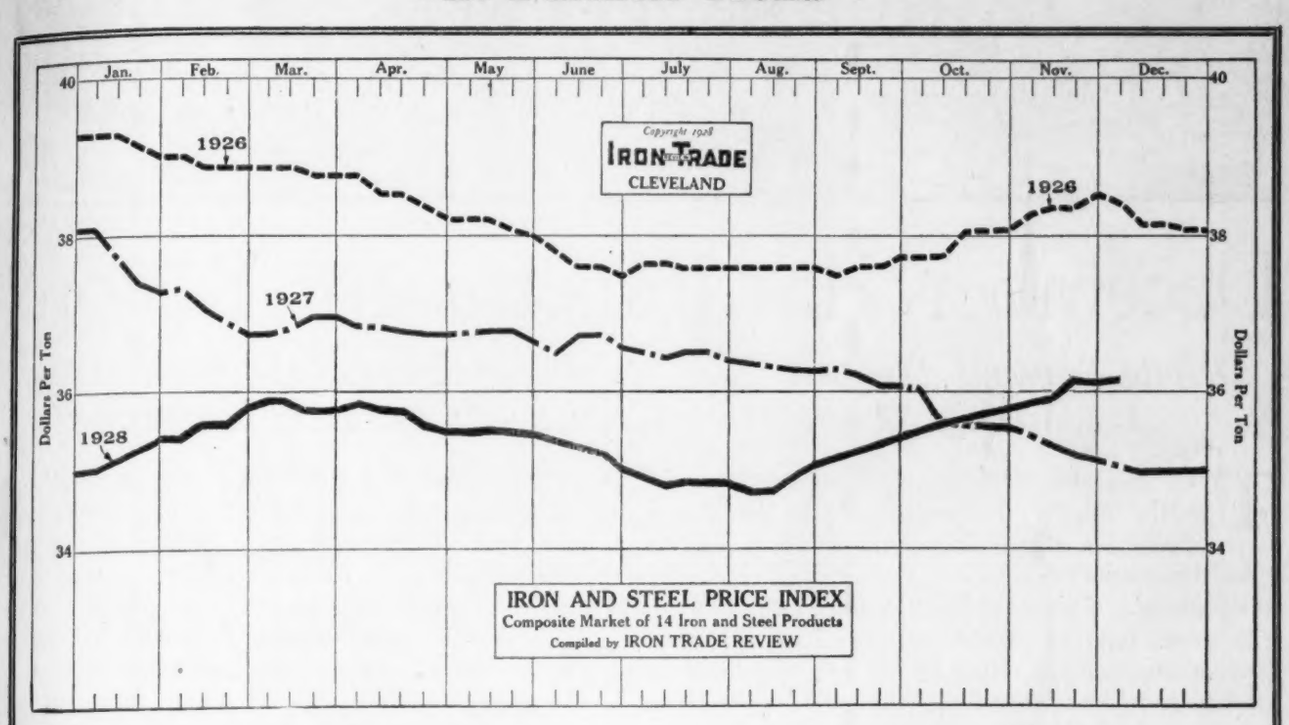
IMPORTANT improvement continues to be maintained in the railway equipment industry. Final figures show that awards for 6140 freight cars of all classifications were placed in November. This is the largest monthly total since April, when 6043 cars were placed and it compares with 1189 in November, 1927. For the first eleven months of the year railroads purchased 39,500 cars compared with 48,398 in the like period of 1927. The outlook is for continued improvement in 1929.

Freight Car Loading

IMPORTANT evidence that general business continues to run well ahead of that of one year ago is found in the record of freight car loadings. For the week ending Nov. 24 loadings totaled 1,026,690 cars. This was a decrease of 31,000 compared with the preceding week but a gain of 188,000 cars over the corresponding week of 1927. Compared with one year ago the most pronounced increases were noted for miscellaneous freight, coal and merchandise in less than carload lots.



The Business Trend

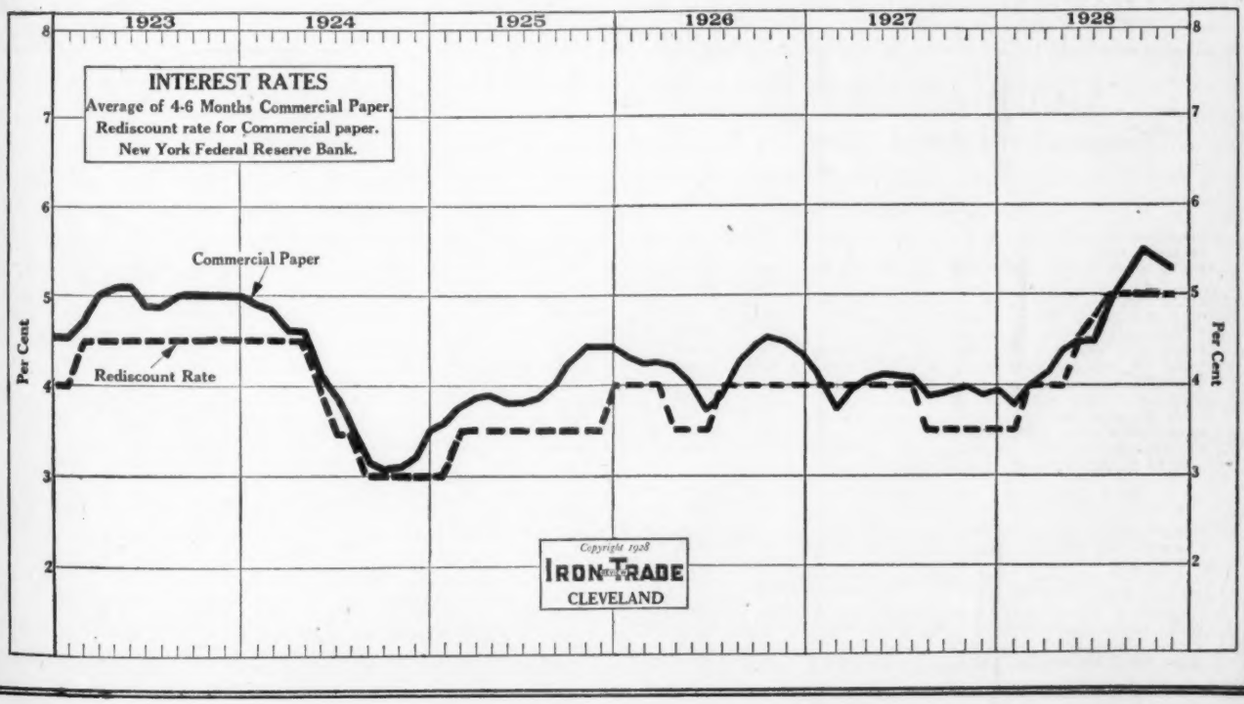


Iron and Steel Price Index

AFTER showing some weakness the last two weeks IRON TRADE REVIEW'S composite market average advanced again in the first week of December. The rise was occasioned largely by the increase in Virginia pig iron prices. The index as of Dec. 4 stood at $36.16 per ton compared with $36.13 per ton one week before. The average is now substantially above that of one year ago which stood at $35.09 per ton. From all indications the position of light steel products is especially strong.

Interest Rates

THE credit situation, influenced partly by preholiday demand for funds, became firmer in December. This was reflected in the skyrocketing of call loan rates on the New York stock exchange, to the highest level since 1920. The industrial demand for funds together with the crop movement requirements passed their peak earlier in the autumn with the result that commercial paper rates show some decline in the past month or two. No stringency of credit for business has yet appeared.



December Has Impetus for Record

Despite Seasonal Dampers, Steel Sales and Output Are High—Wire Products Up $2—Pig Iron Sales Lag—15,500 Cars Pending

THE iron and steel industry having come up to the middle of December with sales and production only mildly impaired by seasonal conditions, another monthly steel record seems in the making. November, with a daily rate of 163,822 gross tons of ingots, surpassed all previous Novembers, topping 1927 by 30 per cent, and if December holds within 8 per cent of last month—as now seems possible—it will be the sixth consecutive record month.

Low Stocks Indicate High Consumption

Including the 4,259,380 tons of November, the eleven-month ingot total stands at 45,837,791 tons. In all 1926, the banner year, only 46,597,475 tons was produced. An estimated 3,900,000 tons for December puts 1928 across the line with 3,150,000 tons to spare. There being no stocks in the hands either of producers or consumers, a record consumption also is indicated.

Giving proper weight to year-end and inventory letups, which are approaching, steelmaking operations the past week showed extraordinary vigor. In the Mahoning valley accelerated bar and pipe production has more than compensated for the dropping of some sheetmaking capacity, and independent steelmakers have lighted three additional open-hearth furnaces. The Chicago and Pittsburgh districts hold at about 80 per cent. Steel corporation subsidiaries this week are at 82 per cent, down 2 points from last week.

Sheets are noteworthy for their vigor in all markets. Orders booked by Pittsburgh and Youngstown mills have rarely been exceeded in December. An increasing volume of business for the first quarter is being booked at the new prices, generally $2 higher than for the current quarter, and makers are insisting that specifications be in by Dec. 15. Some large automotive users have covered at the new levels. Chicago mills have extended their backlogs on blue annealed to three weeks.

Auto Parts Makers Specify Bars

Parts makers at Chicago have re-entered the steel bar market in sufficient force to push deliveries back to three to five weeks on the more desirable sizes. Farm implement manufacturers

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 12, 1928	Nov., 1928	Sept., 1928	Dec., 1927
PIG IRON				
Bessemer, del., Pittsburgh	$20.01	19.96	18.86	19.36
Basic, valley	17.50	17.70	16.10	17.00
Basic, eastern, del. eastern Pa.	19.75	19.75	19.00	19.25
No. 2 foundry, del., Pittsburgh	19.76	19.56	18.61	19.01
No. 2 foundry, Chicago	20.00	20.00	18.25	18.50
*Southern No. 2, Birmingham	16.50	16.38	16.25	16.00
*Southern Ohio, No. 2, Ironton	18.50	18.25	19.00	19.00
**No. 2X, Virginia furnace	21.25	20.50	20.50	21.00
**No. 2X, eastern, del. Phila.	21.76	21.51	21.01	20.26
Malleable valley	18.00	17.90	17.10	17.35
Malleable, Chicago	20.00	20.00	18.25	18.50
Lake Superior charcoal, del. Chicago	27.04	27.04	27.04	27.04
Gray forge, val., del. Pittsburgh	18.76	18.66	18.01	18.56
Ferromanganese, del. Pittsburgh	109.79	109.79	109.79	102.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.				
COKE				
Connellsville, furnace, ovens	2.75	2.85	2.75	2.60
Connellsville, foundry, ovens	3.75	3.75	3.75	3.60
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	34.00	33.60	33.00	34.00
Sheet bars, open-hearth, Pittsburgh	34.00	33.60	33.00	34.00
Billets, open-hearth, Pittsburgh	33.00	33.00	32.00	33.00
Wire rods, Pittsburgh	42.00	42.00	42.00	40.00

	Dec. 12, 1928	Nov., 1928	Sept., 1928	Dec., 1927
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.90	1.95	1.90	1.80
Steel bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, Philadelphia	2.27	2.27	2.22	2.12
Iron bars, Chicago	2.10	2.00	2.00	1.90
Shapes, Pittsburgh	1.90	1.95	1.90	1.80
Shapes, Philadelphia	2.06	2.11	2.06	2.08
Shapes, Chicago	2.00	2.00	2.00	1.90
Tank plates, Pittsburgh	1.90	1.95	1.90	1.80
Tank plates, Philadelphia	2.15	2.15	2.10	2.05
Tank plates, Chicago	2.00	2.00	2.00	1.90
Sheets, black, No. 24, Pittsburgh	2.85	2.80	2.65	2.70
Sheets, blue anl., No. 10, Pittsburgh	2.10	2.05	2.00	2.10
Sheets gal., No. 24, Pittsburgh	3.60	3.55	3.50	3.60
Sheets, black, No. 24, Chicago	3.00	3.00	2.85	2.95
Sheets, blue anl., No. 10, Chicago	2.25	2.15	2.15	2.25
Sheets, galvanized, No. 24, Chicago	3.75	3.65	3.65	3.80
Plain wire, Pittsburgh	2.50	2.40	2.40	2.35
Wire nails, Pittsburgh	2.65	2.55	2.55	2.45
Tin plate, per base box, Pittsburgh	5.35	5.30	5.25	5.25
SCRAP				
Heavy melting steel, Pittsburgh	17.50	17.35	16.55	14.95
Heavy melting steel, eastern Pa.	15.00	15.90	14.65	14.00
Heavy melting steel, Chicago	14.50	14.50	12.90	11.95
No. 1 wrought, eastern Pa.	15.50	15.50	15.10	15.60
No. 1 wrought, Chicago	14.50	14.25	12.90	11.40
Rails for rolling, Chicago	16.50	16.50	15.80	14.10

Current Prices for Rolled Steel Products

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

STEEL PLATES

Pittsburgh, base	1.90c to 2.00c
Philadelphia, del.	2.15c to 2.25c
New York, del.	2.225c to 2.325c
Boston, del.	2.265c to 2.415c
Chicago, base	2.00c to 2.10c
Cleveland, delivered	2.09c to 2.19c
Lackawanna, N. Y.	2.00c
Birmingham, base	2.15c to 2.25c
Pacific Coast, c.i.f.	2.20c to 2.30c

STRUCTURAL SHAPES

Pittsburgh, base	1.90c to 2.00c
Philadelphia, del.	2.00c to 2.11c
New York, del.	2.19c to 2.24c
Boston, del.	2.265c to 2.415c
Chicago, base	2.00c to 2.10c
Cleveland, delivered	2.09c to 2.19c
Lackawanna, N. Y.	2.05c
Birmingham, base	2.15c to 2.25c
Pacific Coast, c.i.f.	2.35c

BARS

SOFT STEEL

Pittsburgh, base	1.90c to 2.00c
Chicago, base	2.00c to 2.10c
Birmingham, base	2.15c to 2.25c
Lackawanna, N. Y., base	2.05c to 2.10c
Pacific Coast, c.i.f.	2.35c
Cleveland, base	1.90c to 1.95c
Philadelphia, del.	2.22c to 2.32c
New York, delivered	2.24c to 2.34c
Boston, delivered	2.265c to 2.415c
Pittsburgh, cold finishing	2.05c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.95c
Eastern mills	1.85c

IRON

Chicago, base	2.00c to 2.10c
New York, delivered	2.19c to 2.24c
Philadelphia, delivered	2.17c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh billet, cut lengths	2.25c
Stock lengths from mill	2.00c
Chicago, billet	2.35c to 2.60c
Chicago, rail steel	2.05c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.57c

COLD FINISHED STEEL

Cold finished steel bars, drawn or rolled, Pitts., Chi., c.l.	2.20c
Shafting (turned, polished) Pittsburgh	2.20c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.55c to 3.00c
Cold finished steel bars, Cleve.	2.25c

TIN AND TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35

Gary, Ind., base 10 cents higher.

Long ternes, primes, No. 24	4.00c to 4.10c

*Price subject to quantity differentials.

SHEETS

SHEET MILL BLACK

No. 24, Pittsburgh base	2.75c to 2.85c
No. 24, Philadelphia, delivered	3.07c to 3.17c
No. 24, Gary, Indiana Harbor	2.85c to 2.95c
No. 24, Chicago, delivered	3.00c to 3.10c
No. 24, Birmingham, base	3.00c

TIN MILL BLACK

No. 28, Pittsburgh, base	3.00c
No. 28, Gary, base	2.95c to 3.05c

GALVANIZED

No. 24, Pittsburgh, base	3.50c to 3.60c
No. 24, Philadelphia, delivered	3.82c to 3.92c
No. 24, Gary, Indiana Harbor	3.70c
No. 24, Chicago, delivered	3.75c
No. 24, Birmingham, base	3.75c

BLUE ANNEALED

No. 10, Pittsburgh, base*	2.00c to 2.10c
No. 24, Philadelphia, delivered	2.32c to 2.42c
No. 10, Gary, Indiana Harbor	2.20c
No. 10, Chicago, delivered	2.25c
No. 10, Birmingham, base	2.25c

*Plus 0.10 cents for 45 inches or wider.

AUTOMOBILE

No. 20, Pittsburgh, base	4.10c

FURNITURE

No. 24, Grade A, Pittsburgh	3.90c to 4.00c
No. 24, Grade B, Pittsburgh	3.75c to 3.85c

(Turn to the following page)

also are specifying at a high rate, and their takings of bars this year apparently will exceed previous highs. In the Pittsburgh and eastern Pennsylvania districts bar users are easing off.

Inquiries are out in the East for two more steamers, requiring 4500 tons of steel each, swelling to practically 100,000 tons the amount of ship work pending. Fresh inquiry at Chicago for western tank work totals 10,000 tons of plates. A 4500-ton pipe line for Brooklyn, N. Y., is added to 55,000 tons of plates already sought for eastern lines. The 15,500 freight cars now on inquiry indicate the purchase of over 150,000 tons of heavy steel, chiefly plates.

Most Wire Products Advanced $2

Wire products makers generally have adjusted prices on a new basis, the effect of which is to advance prices on practically all products save fence and manufacturers' wire $2 per ton for the first quarter. In cold finished bars, strip and other products on which ccurrent prices have been extended the lack of a price incentive is slowing up contracting. At Chicago production of hot strip has been increased.

Pig iron more than finished steel has been touched by seasonal factors. Sales are reacting to the extremely heavy coverage last month and shipments are beginning to slow up as foundries approach the inventory period. Pig iron prices generally are unchanged. Beehive coke continues easy on account of surplus production. Iron and steel scrap is a little stronger as railroad lists have brought higher prices.

With the Lehigh Valley inquiring for 1000 freight cars and the Missouri Pacific for over 3100, pending cars approximate 15,500. The Baltimore & Ohio has placed 88,000 tons of rails, the Missouri Pacific nears action on 50,000 tons, and three western roads should place 50,000 tons in the next week. Chicago district rail mills have stepped up operations 15 per cent, to 65 per cent.

Unfilled Tonnage Loss Against Custom

The decline of 78,030 tons in the unfilled tonnage of the United States Steel Corp as of Nov. 30 goes against tradition, as bookings of track material and tin plate for the following year usually more than neutralize seasonal losses.

Although the suit of the Bethlehem Steel Co. against the United States Steel Corp., alleging infringement of its patents in rolling wide flange structural sections, carries the possibilities of far-reaching market effects, none has yet been felt. Since introducing its special sections Corporation subsidiaries have issued written guarantees against damages, where requested. An extended court fight is anticipated, and whether the markets will be affected immediately depends largely upon the ruling on Bethlehem's plea for an injunction.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (Dec. 11, 1928)	$36.24
Last week (Dec. 4, 1928)	36.16
One month ago (November, 1928)	36.02
Three months ago (September, 1928)	35.19
One year ago (December, 1927)	35.09
Ten years ago (December, 1918)	57.24
Fifteen years ago (December, 1913)	23.29

With wire products advanced $2 per ton the IRON TRADE REVIEW composite of fourteen leading iron and steel products has regained all the ground lost recently, and has advanced 8 cents this week, to $36.24.

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

SEE ALSO PRECEDING PAGE

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts.	1.90c to 2.00c
Hot strip, 6 1/16 to 24-in., Pitts.	1.80c to 1.90c
Hot rolled strip, 12 to 24-inch 16 gage and heavier, coils or cut length, 1.90c to 2.00c plate basis, or 2.00c blue annealed basis.	
Hot strip, bands, under 6-in. Chicago	2.10c to 2.30c
6 to 20 in.	2.00c to 2.10c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve. (3 tons and over)	2.85c to 2.95c
Worcester, Mass. (3 tons and over)	3.10c to 3.20c

ALLOY STEEL

Hot Rolled
F.o.b. Mills

Alloy Quality Bar Base is 2.65c to 2.75c

S.A.E. Series Number	Alloy differential	Net, 100 lb. bars
2000	0.25	$3.00
2100	0.55	3.30
2300	1.50	4.25
2500	2.25	5.00
3100	0.55	3.30
3200	1.35	4.10
3300	3.80	6.55
3400	3.20	5.95
4100 0.15-0.25 Mo.	0.50	3.25
4100 0.25-0.40 Mo.	0.70	3.45
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.80
5100 0.60-0.90 Cr.	0.35	3.10
5100 0.80-1.10 Cr.	0.45	3.20
5100 Chrome Spring	0.20	2.95
6100 Bars	1.20	3.95
6100 Spring Steel	0.95	3.70
Chrome Nickel Vanadium	1.50	4.25
Carbon Vanadium	0.95	3.70
9250 (flats)	0.25	3.00
9250 (rounds, squares)	0.50	3.25

TUBING

Boiler

Carload Discounts—Less-carloads 4 points Lower—F.o.b. Pittsburgh Mills

Steel 3¼ to 3¾-inch	42½
Charcoal iron, 3¼ to 4½-inch	9
Seamless hot rolled 3¼ to 3½-inch	56

Further discounts of six 5 per cents for 21,000 pounds or more on lap welded steel. On charcoal two 10's and one 2½ on 12,000 pounds or more.

COLD DRAWN SEAMLESS

F.o.b. mill in desirable quantities

Random lengths, over 5 feet	55 per cent
Selected lengths, 1 to 18 feet	53 per cent

WIRE PRODUCTS

To Jobbers in Carloads

F.o.b. Cleveland and Pittsburgh base
Dealers 10 cents per 100 pounds extra

Bright plain wire, 6 to 9 gage	2.50c
Annealed fence wire	2.65c
Galvanized wire, 6 to 9 gage	3.10c
Barbed wire, painted	3.05c
Barbed wire, galvanized	3.30c
	Per 100 lbs.
Wire nails	$2.65
Galvanized nails, plus differ.	4.65
Polished staples	3.10
Galvanized staples	3.35
Coated nails, 100 lb. kegs, Sept. 1, 1926, extras supply	2.65
Woven wire fencing (retailers) 12½ gage, 26-in. high, 7-in. bars and 12-in stays, per 100 rods, f.o.b. Pitts.	$20.03

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Cleveland-Pittsburgh base on products made there; Duluth $2 higher, Worcester, Mass., and Fairfield, Ala., $3 higher.

CUT NAILS, CHAIN, PILING

Cut nails, c.l., f.o.b. mills	2.75c
Cut nails, l.c.l. f.o.b. mills	2.85c
Chain, 1-in., proof coil, Pitts.	6.60c
Sheet piling base, Pittsburgh	2.25c

CAST IRON WATER PIPE

Prices per net ton

Class B pipe

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	49.20 to 50.20
Six-inch to 24-inch, Chicago	45.20 to 46.20
Four-inch, New York	41.60 to 43.10
Six-inch and over, New York	38.60 to 40.10
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

IRON AND STEEL PIPE

Base Discounts Pittsburgh and Lorain, O., to Jobbers in Carloads

	Black	Galv.
1 to 3-inch butt steel*	62	50*
1 to 1½-inch butt iron	30	13

Indiana Harbor, Ind., and Evanston, Ill., 2 points less, Chicago, del., 2½ points less.

*To large jobbers these discounts are increased on black by 1 point and a supplementary discount of 5 per cent on galvanized by 1½ points with a supplementary 5 per cent.

RAILS, TRACK MATERIAL

Standard bessemer rails, mills	$43.00
Standard open-h'th rails, mill	$43.00
Relaying rails, St. Louis	$24.00 to 31.00
Relay rails, Pitts. 60 to 90 lb.	$22.00 to 27.00
Light rails, 25 to 45, mills	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand, jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.

Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Lag Screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off

Stove bolts, 75, 20, 10 and 5 off in pkgs., 75, 20, 10 and 5 with 2½ off in bulk.

Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1 in. diam. and smaller	85-5 off

SQUARE HEAD SET SCREWS

Milled	80-10 off
Upset 1 in. diam. and smaller	80-10-10 off

RIVETS

Struct., c.l., Pitts.-Cleve.	2.80c to 2.90c
Structural, c.l., Chicago	3.00c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and 10 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

WASHERS

Wrought, c.l., Pitts. dist.	$6.50 to 6.75 off
Wrought, c.l., Chicago dist.	$6.70 to 6.90 off
Lock: To dealers	85-5 off
Lock: To consumers	85 off

Raw Materials and Semifinished Products

SEMIFINISHED MATERIAL

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pittsburgh, open-hearth	$33.00
Pittsburgh, bessemer	33.00
Youngstown	33.00
Cleveland	34.00
Philadelphia	38.30 to 39.30
Chicago	35.00
Forging, Chicago	40.00
Forging, Pittsburgh	38.00
Forging, Philadelphia	43.30

SHEET BARS

Pittsburgh	$34.00
Youngstown	34.00
Cleveland	34.00
Chicago	35.00

SLABS

Pitts., Young., and Cleve.	$33.00

WIRE RODS

Pittsburgh, Cleveland	$42.00
Chicago	43.00

SKELP

All grades, Pittsburgh	1.85c to 1.90c

IRON ORE

LAKE SUPERIOR ORE
Per Gross Ton, Lower Lake Ports

Old range bessemer, 51½%	$4.55
Mesabi bessemer, 51½%	4.40
Old range nonbessemer 51½%	4.25
Mesabi nonbessemer, 51½%	4.25

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%	8.00
Copper free low phosphorus 58 to 65 per cent	nominal

FOREIGN ORE
Cents per unit, alongside docks, Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-8% manganese	10.50 to 11.00
North African low phosphorus	10.00 to 11.00
Swedish foundry or basic, 65%	9.00 to 9.50
Spanish and North African basic, 50 to 60 per cent	nominal
Newfoundland foundry, 55%	8.50

MANGANESE ORE

Prices do not include duty of 1 cent per pound of metallic manganese contained.

Brazilian	35 cents
Indian	35 to 36 cents
Caucasian (53-55 per cent)	36 to 38 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, imported duty paid, east, tidewater, gross ton	$19.40 to 20.40

REFRACTORIES

FIRE CLAY BRICK
Per 1000 f.o.b. works

First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK
Per Net Ton

9 x 4½ x 2½	65.00

MAGNESITE
Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00

CHROME BRICK
Net Ton Chester, Pa., and Baltimore base

9 x 4½ x 2½	45.00

Pig Iron

Sales Volume Smaller—Shipments Below November Rate—Furnace Equipped with Good Backlogs—Prices Firm

AFTER more than two months of heavy selling in the pig iron market and record shipments, new business has tapered off, and the movement of iron to melters is falling behind the November rate. Business is less active now because the majority of large users have covered through the first quarter, and many have placed orders for first half. Shipments are reduced due to the fact foundries are slowing up during the inventory period. Not much iron remains to be purchased for first quarter, while the lower rate of shipments is believed to be a temporary phase. Furnace backlogs are so good, and stocks have been so reduced, that prices have not been disturbed. The season's shipment of iron by boat from lower lake furnaces to the Chicago district is 25,000 tons.

PITTSBURGH, Dec. 11.—Pig iron producers continue to ship steadily on old orders but new business still is restricted to small purchases. Lack of large tonnages gives the market the appearance of dullness, but the general run of small orders provides a fairly high aggregate. Some furnaces are well booked and in certain instances shipments are equal to output. Foundry iron is being sold in lots of a few hundred tons at a time. Some orders are being received for December shipment, and a fair tonnage remains to be closed for first quarter. On No. 2 foundry iron $18, valley, still prevails. An inquiry from the Westinghouse Electric & Mfg. Co. is understood to be smaller than years ago due to its trend away from iron castings. The company also is buying an unstated tonnage of bessemer iron. The latter holds at $18.25 to $18.50, valley, with sales generally in small lots. It is understood the Edgewater Steel Co. is closing for 5000 tons of basic but other inquiries are lacking. The fact that the price is 50 cents to $1 above the level of a year ago is considered responsible for delay in active closing for first quarter requirements.

Boston, Dec. 11.—Pig iron sales in this district during the past week totaled 15,000 tons. The Mystic Iron Works hold 12,000 tons to a radiator manufacturer for first quarter. A Buffalo furnace booked one order for 1000 tons. A little charcoal iron was sold at $24, base, furnace. Prices are strong. It is understood that Mystic is getting the equivalent of $17 for No. 2 plain and $17.50 No. 2X.

New York, Dec. 11.—Pig iron business has been comparatively quiet the past week, the total of sales being 6000 tons. Several inquiries are pending. General Electric Co. wants about 4000 tons of foundry iron for first quarter shipments to various plants. Prices are firm. Foundry iron is $18, base, Buffalo.

Buffalo, Dec. 11.—Pig iron sales and inquiries are small but shipments are unusually good for December. Stocks have been reduced to the low point of the year at all furnaces here. Foundries have small stocks. Tonawanda Iron Co. will resume operation about Dec. 20. Another furnace of the M. A. Hanna Co. will go into production soon. First quarter bookings are satisfactory. Prices are firm.

Youngstown, O., Dec. 11.—The Struthers Furnace Co. plans to relight its merchant blast furnace at Struthers, O., Dec. 13. The stack has been relined, and the company has sold considerable foundry and standard basic grades. Some small lots of No. 2 foundry have been sold here at $18, valley, and standard malleable at $18.25 to $18.50, furnace. No basic inquiries are pending. The general valley asking price on basic is $18.

Cleveland, Dec. 11.—The majority of large consumers of pig iron have covered requirements for first quarter, and some have contracted for first half. The approach of holidays, inventories and slower rate of consumption are holding current shipments below the November rate. New sales also are smaller. The total for the past week was 18,000 tons, reported by furnace interests with headquarters in Cleveland, compared with 31,000 tons in the week preceding. It was the smallest week's business in more than two months. Inquiries also are diminishing in number and size. General Electric Co. wants 1000 tons of various grades for its Erie and Schenectady, N. Y., plants. Cleveland furnaces continue to quote $19, base, furnace, for local delivery, for prompt, first quarter or second quarter delivery, and $18 in outside competitive districts. The price situation in other lake districts is unchanged.

Detroit, Dec. 11.—Demand for pig iron reflects the expected sequel to the recent heavy coverage, some of which has gone into the first half of 1929. Shipments continue heavy and no stocks are being built up on consumers' yards, indicating a melt higher than the recent lull in automotive production would indicate. No. 2 foundry iron is quoted at $20, Detroit furnace, and malleable iron at $20.50.

Cincinnati, Dec. 11.—Pig iron demand is quieter. Some southern iron has been placed in this district at $17, base, Birmingham. Although one Birmingham furnace and one in Tennessee hold to this price, $16.50, base, Birmingham has not disappeared. A spread also continues in Jackson county silvery and bessemer ferrosilicon irons, one maker having advanced $2 and the other $1 a ton, and neither changing their position for the past two weeks.

St. Louis, Dec. 11.—Following the recent brisk buying movement, there is a lull in pig iron sales. The market continues strong.

One leading east side steel interest covered its first quarter requirements of basic by purchasing 15,000 tons from the St. Louis Gas & Coke Corp. Other local steelmakers are well supplied, though if the present promise of equipment business is fulfilled addi-

(*Concluded on Page* 1531)

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$18.25 to 18.50
Bessemer, del. Pittsburgh	20.01 to 20.26
Basic, valley furnace	17.50 to 18.00
Basic, del. Pittsburgh	19.26 to 19.76
Basic, Buffalo furnace	17.50
Basic, del. eastern Pa.	19.75 to 20.00
Malleable, valley furnace	18.00 to 18.50
Malleable, del. Pittsburgh	19.76 to 20.26
Malleable, del. Cleveland	19.50
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	19.00
Malleable, del. eastern Pa.	21.50 to 22.00
Malleable, Granite City fur.	20.50
No. 1 foundry, Chicago furnace	20.50
No. 1X, eastern del., Phila.	22.26 to 22.76
No. 1X, Buffalo furnace	20.00
No. 2 foundry, valley furn.	18.00
No. 2 foundry, del. Pittsburgh	19.76
No. 2 plain, Buffalo furnace	18.50
No. 2 foundry, Chicago furnace	20.00
No. 2 foundry, Granite City	20.00
No. 2 foundry, Ironton furnace	18.50
No. 2 foundry, del. Cleveland	19.50
No. 2 plain, del., Phila.	21.26 to 21.76
No. 2 plain, Virginia furnace	20.75
No. 2 plain eastern Pennsylvania, del. Boston	24.15 to 24.65
No. 2 plain, N. J., tidewater	20.78 to 21.28
No. 2 Alabama, Birmingham	16.50 to 17.00
No. 2 Alabama, del. Cincinnati	20.19 to 20.69
No. 2 Tenn., Birmingham base	16.50
No. 2 Tenn., del. Cincinnati	20.19
No. 2 Alabama, del. Chicago	22.51 to 23.01
No. 2 Alabama, del. Cleveland	22.76 to 23.26
No. 2 Alabama, del. St. Louis	21.42
No. 2X, east, N. J., tidewater	21.28 to 21.78
No. 2X, eastern, del. Phila.	21.76 to 22.26
No. 2X, foundry, Buffalo furnace	19.00
No. 2X, eastern, del. Boston	24.65 to 25.15
No. 2X, Virginia furnace	21.25
Gray forge, val., del. Pittsburgh	19.26
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.26 to 24.76
Low phos., copper bearing fur.	23.00 to 23.50
Charcoal, Birmingham	28.00
Charcoal, Superior, del., Chicago	27.04

CANADIAN PRICES

No. 2 foundry, del. Toronto	23.60
No. 2 foundry, del. Montreal	25.00
Malleable, del. Toronto	23.60
Malleable, del. Montreal	25.00
Basic, del. Montreal	24.00

Silvery iron, Jackson county, O., furnaces, in per cents: 5—$23 to $24; 7—$25 to $26; 8—$26 to $27; 9—$27 to $28; 10—$29 to $30; 11—$31 to $32; 12—$33 to $34; 13—$35 to $36.

Bessemer ferrosilicon, Jackson county, O., furnaces, in per cents: 10—$31 to $32; 11—$33 to $34; 12—$35 to $36; 13—$37 to $38; 15—$41.50 to $42.50; 16—$43 to $44.

Coke

Market Is Quiet—Prices Steady —Foundries Taking Less Fuel— Beehive Stocks Held Down

QUIETER conditions are noted in the market for beehive and by-product furnace and foundry coke. Foundries in some districts have reduced operations and are taking less coke because of the approach of inventory. Prices are steady in all districts. Beehive furnace fuel continues to be offered at $2.75, Connellsville, although surplus tonnage has not been increased much.

Pittsburgh, Dec. 11.—Beehive coke demand shows little improvement, and although the tonnage of surplus fuel has not increased much, buyers still are able to obtain the furnace grade at $2.75. Furnace operations are fairly steady, and stacks scheduled to go in shortly are expected to offset the lower production of those in blast. Some inquiry has been received for first quarter, but buying is not active. Foundry coke specifications are lighter, in line with reduced operations. Prices are steady at $3.75 to $4.85. Most consumers of the better grades of foundry coke are under contract for first quarter.

Production of coke in the Connellsville region for the week ended Dec. 1 was 59,030 tons compared with 58,400 tons the preceding week, according to the *Connellsville Courier*.

Boston, Dec. 11.—Foundries continue to take a fair supply of coke. Prices are firm. A better demand for domestic sizes is noted.

New York, Dec. 11.—Coke demand is slower with the approach of inventory. Consumption is maintained at about the same rate as over the last two months. By-product foundry coke continues $8.30, ovens, in northern New Jersey, equivalent to $9 to $9.40, delivered at Newark. In New England the price continues $11, delivered at most consuming points. Beehive foundry coke continues $4.85, Latrobe, Pa., and at $3.75 to $4.25, Connellsville, although it is difficult to obtain Connellsville brands at less than $4 or $4.25.

Cincinnati, Dec. 11.—Foundry coke specifications are slightly higher, and new orders indicate an increase in business for December. A local seller has closed a Michigan melter for 6000 tons of foundry coke for first half. Prices are steady.

St. Louis, Dec. 11.—Demand for foundry coke continues fairly active, with specifications since Dec. 1 up to the average of November. Consumers' stocks are light.

Public utilities, notably the water and gas interests, have been ordering out their coke actively. Coke prices are steady. Illinois coal operators are steadily regaining trade formerly lost to nonunion fields, and the outlook for the next few months is good.

Birmingham, Ala., Dec. 11.—Shipping coke outside the South is proving profitable to Alabama producers. By-product works in Birmingham are active, and production is a little improved. Independent cokemakers are not accumulating stocks. Prices are steady.

Coke Prices

Prices per Net Ton

Beehive Ovens	
Connellsville furnace	$2.75
Connellsville foundry	3.75 to 4.85
New River foundry	6.50 to 7.00
New River furnace	6.50
Wise county foundry	4.50 to 5.25
Wise county furnace	3.75 to 4.75
By-Product Foundry	
Newark, N. J., del.	9.00 to 9.40
Chicago, ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham	5.00
Indianapolis, del.	8.25
Ashland, Ky.	7.00
Portsmouth, O.	7.00
Detroit, ovens	8.50
Buffalo, ovens	9.00

Ferroalloys

Requirements for 1929 Covered—Spot Spiegeleisen Stronger

Pittsburgh, Dec. 11.—Ferroalloy contracting for 1929 is nearly completed. Ferromanganese continues $109.79, delivered, Pittsburgh, at which price first-half contracts were signed. Spiegeleisen contracts were taken at $33, furnace, with lower prices applied on lots above 100 tons. Makers anticipate high operations next year to supply regular customers and have advanced the spot price to $34. Spot buying, however, is relatively light. Specifications against fourth quarter contracts are well maintained. Business so far in 1928 indicates the year will approach a new record in consumption of several ferroalloys. Fluorspar is strong at $18, at which price a number of contracts for next year have been signed.

New York, Dec. 11.—Further contracting has featured the ferromanganese market. A considerable portion of the trade, comprising those interests who consume the bulk of the tonnage, now is covered over the whole of 1929 at $105, duty paid, tidewater On spot sales of spiegeleisen, involving lots of carloads up to 100 tons, the price continues $34, furnace, for 19 to 21 per cent. This price is subject to differentials for larger tonnages.

Special ferroalloys for next year now are well under contract. Prices, as announced in these columns some time ago, are unchanged for next year, except a cut of 1 cent on low-carbon ferrochrome. Ferrotungsten and tungsten ore are strong, the latter $11.50 a short ton unit duty paid.

Bolts, Nuts, Rivets

Specifications Steady and First Quarter Contracts Are Being Made

NUT AND BOLT PRICES, PAGE 1516

Pittsburgh, Dec. 11.—Bolt, nut and rivet producers are mailing first quarter contracts this week for customers' signatures. Current prices of 60 to 70 off for bolts and nuts, and 2.90c, Pittsburgh, for large rivets will be continued. Specifications against existing contracts are steady, showing little change from the rate earlier this month. Operations hold at 60 to 65 per cent.

New York, Dec. 11.—Demand for bolts and nuts is less than in November, which was below October. It is expected that Patrick McGovern Inc. soon will place about 900 tons of tie rods for a water line between Brooklyn and Yonkers for the New York board of water supply.

Cleveland, Dec. 11.—Books have been opened for the first quarter on nuts, bolts and rivets at unchanged figures. Some progress has been made in contracting. Specifications on fourth quarter contracts are steady but volume has been slowed down to keep inventories low. Nut and bolt manufacturers are on a 70 to 75 per cent basis.

Chicago, Dec. 11.—Producers of bolts, nuts and rivets are writing first quarter contracts at the quotations that have been extended from fourth quarter. Specifications are coming in at the rate of the past 60 days. Bolts and nuts are steady at 60 to 70 off and structural rivets are 3.00c, Chicago, in carload lots.

Philadelphia, Dec. 11.—Bolt and nut makers are signing up first quarter contracts at unchanged prices.

Ferroalloy Prices

Ferromanganese, 78 to 82 per cent tidewater duty paid	$105.00
Ferromanganese, del. Pittsburgh	109.79
Spiegeleisen, 19 to 21 per cent domestic furnace, spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do., less carload	88.50
Do., 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.03
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload, producers plant, net ton	200.00
Ferrophosphorus, per ton, carload, 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Quantity diff. apply on 100 tons and over.
*These prices contract, spot $5 higher.

Scrap

Inactivity Rules but Prices Continue Strong on Light Supplies —Some Advances Are Made

WAITING on the part of consumers and dealers is the most marked characteristic of the iron and steel scrap market. Supplies are unusually light and absence of buying has not weakened prices. Prices paid on railroad lists have strengthened the market in some centers. Activity is awaited to give a market test.

Chicago, Dec. 11.—Important consumer buying of iron and steel scrap is slow, owing to recent heavy coverage. Prices remain notably strong, with increases in several grades. Heavy melting steel contnues at $14.50 to $15, and the latter figure has been paid by dealers on a large order for melting steel to be closed soon by an important consumer. Cast borings are maintaining their strength, a fair-sized tonnage having been closed at $12.25, an advance of 25 cents. Dealers are asking as much as $17 for steel angle bars. A scarcity has developed in railroad malleable, and the price is 50 cents higher than a week ago.

Boston, Dec. 11.—While the scrap market remains quiet, a firmer situation prevails. Another steamer has just finished loading 3500 tons for Danzig, resulting in a lull for export business.

New York, Dec. 11.—Consuming demand for scrap continues light, with dealers' buying prices unchanged. While some mills have expressed willingness to close at 50 cents a ton under the going market, sellers are inclined to await developments. A Con-

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except Detroit where dealers' buying prices are shown

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	$11.50 to 12.50
Boston, dealers	11.00 to 11.25
Boston No. 2	10.00 to 10.50
Buffalo, No. 1	16.00 to 16.50
Buffalo, No. 2	13.25 to 14.00
Chicago	14.50 to 15.00
Cincinnati, deal.	13.25 to 13.75
Cleveland, No. 1	14.50 to 15.00
Cleveland, No. 2	14.00 to 14.50
Detroit, No. 1	13.50 to 14.00
Detroit, No. 2	11.00 to 11.50
East Pa., del. mill	15.00 to 15.50
East. Pa., deal. del.	14.50 to 15.00
N. Y., deal., R. R.	11.50 to 12.00
N. Y., deal., yd.	8.00 to 8.50
Pittsburgh, No. 1	17.50
St. Louis, No. 1	13.25 to 13.75
St. Louis, No. 2	12.50 to 13.00
Valleys, No. 1	16.75 to 17.00

COMPRESSED SHEETS

Buffalo	14.00 to 15.00
Chicago	13.00 to 13.50
Cleveland	14.00 to 14.50
Detroit	13.50 to 14.00
Pittsburgh	17.50
Valleys	16.50 to 17.00
E. Pa. new mat.	13.00 to 13.50

BUNDLED SHEETS

Buffalo	11.50 to 12.00
Cincinnati, deal.	10.50 to 11.00
Cleveland	12.00 to 12.25
Eastern Pa.	11.00 to 11.50
Pittsburgh	16.00 to 16.50
St. Louis	8.50 to 9.00

SHEET CLIPPINGS LOOSE

Chicago	7.50 to 8.00
Cincinnati	9.50 to 10.00
Detroit	8.50 to 9.00
St. Louis	8.50 to 9.00

STEEL RAILS, SHORT

Birmingham	12.00 to 13.00
Boston	8.25 to 8.75
Buffalo	17.00 to 18.00
Chicago	17.00 to 17.50
Cincinnati, deal.	19.00 to 19.50
Detroit	17.00 to 17.50
St. Louis	17.50 to 18.00

STOVE PLATE

Birmingham	13.00 to 13.50
Boston consumers	11.00 to 11.50
Buffalo	14.00 to 14.50
Chicago, net	12.25 to 12.75
Cinn., deal., net	9.50 to 10.00
Cleveland	10.00 to 11.00
Detroit, net	9.50 to 10.00
Eastern Pa.	12.00 to 12.50
N. Y., deal., mill	8.25 to 8.75
Pittsburgh	11.50 to 12.00
St. Louis	12.25 to 12.75

SHOVELING STEEL

Chicago	14.50 to 15.00
Pittsburgh	17.50
St. Louis	13.25 to 13.75

KNUCKLES, COUPLERS SPRINGS

Buffalo	17.00 to 17.50
Chicago	16.25 to 16.75
Eastern Pa.	17.00 to 17.50
Pittsburgh	18.50 to 19.00
St. Louis	15.00 to 15.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	17.50 to 18.00
Cincinnati, deal.	15.00 to 15.50
Eastern Pa.	19.00 to 20.50
Pitts. billet and bloom crops	21.00 to 21.50
Cleve. billet and bloom crops	17.00 to 17.50

FROGS, SWITCHES, GUARDS

Chicago	15.50 to 16.00
St. Louis	15.00 to 15.50

ANGLE BARS—STEEL

Buffalo	14.00 to 14.50
Chicago	16.00 to 16.50
St. Louis	14.25 to 14.75

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	9.50 to 10.50
Boston, dealers	9.50 to 10.00
Buffalo, No. 1	12.00 to 12.50
Buffalo, No. 2	14.50 to 15.50
Chicago, No. 1	14.50 to 15.10
Chicago, No. 2	14.50 to 15.00
Cinn., No. 2	13.25 to 13.75
Eastern Pa.	15.00 to 16.00
N. Y., No. 1 deal.	11.00 to 11.50
Pittsburgh, No. 1	13.50 to 14.00
Pittsburgh, No. 2	17.50
St. Louis, No. 1	13.00 to 13.50
St. Louis, No. 2	13.25 to 13.75

WROUGHT PIPE

Boston, dealers	9.50 to 10.00
Eastern Pa.	14.50 to 15.00
Boston	9.00 to 9.50
New York, deal.	10.25 to 10.75

YARD WROUGHT

Boston	9.00 to 9.50
Eastern Pa.	15.00 to 15.50

BUSHELING

Buffalo	14.00 to 15.00
Chicago, No. 1	13.00 to 13.50
Chicago, No. 2	8.50 to 9.00
Cinn., No. 1 deal.	11.00 to 11.50
Cinn., No. 2	7.00 to 7.50
Cleveland, No. 1	12.25 to 12.50
Cleveland, No. 2	11.25 to 11.50
Detroit, No. 1	12.50 to 12.75
Detroit, mixed	7.50 to 8.00
Pittsburgh, No. 1	14.50 to 15.00
St. Louis, No. 1	10.00 to 10.50

MACHINE SHOP TURNINGS

Birmingham	9.00 to 9.50
Boston	6.25 to 6.50
Buffalo	7.50 to 8.00
Chicago	8.00 to 8.50
Cincinnati, deal.	9.50 to 10.00
Cleveland	9.50 to 10.00
Detroit	8.25 to 8.50
Eastern Pa.	11.00 to 11.50
New York, deal.	7.00 to 7.50
Pittsburgh	12.00 to 12.50
St. Louis	9.00 to 9.50

MIXED BORINGS, TURNINGS
For blast furnace use

Boston, dealers	5.50 to 6.00
Buffalo	11.00 to 11.50
Cincinnati, deal.	10.00 to 10.50
Cleveland	11.00 to 11.50
Detroit	9.25 to 9.50
Eastern Pa.	9.50 to 11.00
New York, deal.	6.25 to 7.00
Pittsburgh	11.75 to 12.25

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	9.00 to 9.50
Boston, chem.	10.00 to 10.25
Boston, dealers	5.75 to 6.50
Buffalo	11.00 to 11.50
Chicago	12.00 to 12.25
Cincinnati, deal.	10.00 to 10.50
Cleveland	11.00 to 11.50
Detroit	9.25 to 9.50
Eastern Pa.	11.00 to 11.50
Eastern Pa., chem.	14.50 to 15.00
New York, deal.	6.75 to 7.50
Pittsburgh 4	11.75 to 12.25
St. Louis	9.50 to 10.00
Valleys	12.50 to 13.00

PIPE AND FLUES

Chicago, net	8.50 to 9.00
Cincinnati, deal.	8.50 to 9.00

RAILROAD GRATE BARS

Buffalo	12.50 to 13.00
Chicago, net	12.50 to 13.00
Cincinnati	10.00 to 10.50
Eastern Pa.	12.00 to 12.50
New York, deal.	9.25 to 9.75
St. Louis	11.00 to 11.50

FORGE FLASHINGS

Boston, dealers	9.00 to 9.25
Buffalo	12.25 to 13.25
Chicago	9.50 to 10.00
Cleve., over 10 in.	12.25 to 12.75
Detroit	11.50 to 12.00
Pittsburgh (light)	14.00 to 14.50

FORGE SCRAP

Boston, dealers	6.00 to 6.50
Chicago	16.50 to 17.00
Eastern Pa.	12.00 to 13.00

ARCH BARS AND TRANSOMS

Chicago, net	20.50 to 21.00
St. Louis	22.00 to 22.50

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal	6.75 to 7.00
Buffalo	12.00 to 12.50
Chicago	11.75 to 12.25
Cleveland	12.50 to 13.00
Eastern Pa.	12.00 to 13.00
Pittsburgh	15.00 to 15.50
St. Louis	11.50 to 12.00

STEEL CAR AXLES

Birmingham	16.00 to 17.00
Boston, ship point	16.00 to 16.50
Buffalo	18.25 to 18.75
Chicago	18.00 to 18.50
Cleveland	19.50 to 20.00
Eastern Pa.	22.00
Pittsburgh	20.50 to 21.50
St. Louis	19.50 to 20.00

SHAFTING

Boston, ship point	13.50 to 13.75
Chicago	17.35 to 17.90
Eastern Pa.	19.00 to 20.00
New York, deal.	15.00 to 16.00
St. Louis	18.00 to 18.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	12.00 to 13.00
Boston, con.	14.00 to 14.50
Buffalo, iron	13.00 to 13.50
Buffalo, steel	17.00 to 17.50
Chicago, iron	14.00 to 14.50
Chi., rolled steel	17.75 to 18.25
Cincinnati	12.50 to 13.00
Eastern Pa., cast	16.50 to 17.00
Eastern Pa. rolled	17.00 to 17.50
N. Y., iron, deal.	12.00 to 12.50
Pittsburgh, iron	15.50 to 16.00
Pittsburgh, steel	18.50 to 19.00
St. Louis, iron	14.50 to 15.00
St. Louis, steel	16.00 to 16.50

No. 1 CAST SCRAP

Birmingham, cup.	14.50 to 15.50
Buffalo	15.50 to 16.00
Boston, textile	15.00 to 15.50
Chicago, mach.	17.35 to 17.90
Chicago, railroad	16.25 to 16.80
Chicago, agri.	15.70 to 16.25
Cincinnati, mach. cupalos, net deal.	16.00 to 16.50
Cleveland, cupola	16.00 to 16.50
Detroit, net	13.50 to 14.00
Eastern Pa. cupola	16.50 to 17.00
N. Y., cup., deal.	13.00 to 13.50
N. Y., del. local foundries	16.50 to 17.00
Pittsburgh, cupola	14.50 to 15.00
San Fran., del.	13.50 to 14.00
Seattle	15.50 to 15.75
St. Louis, mach.	15.00 to 15.50
St. Louis	14.00 to 14.50
Valleys	16.50 to 17.00

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	12.50 to 13.00
Cleve., breakable	12.50 to 12.75
Detroit, auto., net	19.00 to 19.50
Detroit, breakable	9.00 to 9.50
Eastern Pa.	16.00
New York, deal.	12.50 to 13.00
Pittsburgh	13.00

MALLEABLE

Boston, railroad	15.75
Buffalo	15.50 to 16.00
Chicago, agri.	13.00 to 13.50
Chicago, railroad	16.00 to 16.50
Cinn., R. R., deal.	15.00 to 15.50
Cinn., agri., deal.	14.00 to 14.50
Cleveland, agri.	15.00 to 15.50
Cleveland, rail.	16.00 to 16.50
Detroit, auto	14.00 to 14.50
Pittsburgh, rail.	14.00 to 14.25
St. Louis, rail	15.00 to 15.50

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	12.00 to 13.00
Boston, dealers	11.00 to 11.50
Rails scrap, Boston	10.00 to 11.00
Skeleton, Boston	9.00 to 9.25
Buffalo	15.00 to 15.50
Chicago	16.50 to 17.00
Eastern Pa.	15.00 to 15.50
New York	11.50 to 12.00
Pittsburgh district	18.00 to 18.50
St. Louis	15.50 to 16.00

LOCOMOTIVE TIRES

Chicago, No. 1	15.00 to 15.50
Chicago, cut	17.50 to 18.00
St. Louis, No. 1	14.00 to 14.50

LOW PHOS. PUNCHINGS

Chicago	16.50 to 17.00
Pittsburgh	19.00 to 19.50

shocken, Pa., consumer has temporarily held up shipments.

Philadelphia, Dec. 11.—The fact that the Pennsylvania railroad obtained higher than $16, delivered eastern Pennsylvania, for heavy breakable cast and higher than $18, delivered in the Pittsburgh district, reflects the fact that the scrap market retains much strength. Some interest is shown in heavy melting steel but actual buying is light. Prices are unchanged.

Buffalo, Dec. 11.—A Buffalo consumer with high requirements has purchased a tonnage of No. 1 heavy melting steel at $16.50. No. 1 cast advanced 25 cents to $16 in a representative sale, while low phosphorus has moved at $17.50. Steel works are inquiring for material for next quarter.

Pittsburgh, Dec. 11.—Iron and steel scrap is stronger, following the sale of heavy melting steel to a nearby mill at $17.50, an advance of 50 cents over previous transactions. A further strengthening factor is the reported $18.25 price paid for the heavy melting steel on the December list of the Pennsylvania railroad. Steel specialities brought $18.85, and knuckles and couplers and railroad coil and leaf springs are quotably higher. Dealers are not anxious to take additional business even at $17.50. Blast furnace grades are stronger and compressed and bundled sheets have moved up in sympathy with heavy melting steel.

Cleveland, Dec. 11.—While most short scrap orders have been covered and no fresh short selling has taken place, there is some dealer activity. This alone keeps the market steady at unchanged figures. Local mills remain consistently out of the market. Some have large reserve stocks. Some contracts expire in 10 or 15 days in the Mahoning valley. Dealers there in covering are halving their potential profits to avoid cancellation.

Detroit, Dec. 11.—Dealers are confident of the strength of iron and steel scrap. No. 1 heavy melting steel is scarce, with plenty of the No. 2 offered. Turnings are fairly plentiful. Cast grades are more plentiful than steel. One dealer has bought stove plate on the basis of $10, delivered to a consumer here. Automobile malleable is weaker, at $14 to $14.50, while compressed sheets are stronger at $13.50 to $14. Some dealers hold No. 1 busheling at $12.50 to $12.75 is 25 cents too high, and that rails are no higher than $14.

Cincinnati, Dec. 11.—Prices of iron and steel scrap have strengthened and advances of 25 cents have been made on a number of grades. Light buy at present has not weakened prices. Several railroad lists are pending.

St. Louis, Dec. 11.—Fair buying activity is reported in iron and steel scrap, with prices strong. The melt is holding up well, and numerous users need scrap, but are resisting prices, and deferring buying anything not urgently wanted. Not much scrap is available, and some grades are scarce.

Birmingham, Ala., Dec. 11.—While considerable scrap is moving there is evidence of curtailment of melt, though many consumers are in steady operation. Prices are practically unchanged. Heavy melting steel, better quality, commands $12.50.

Toronto, Ont., Dec. 11.—Except for steadily increasing demand there has been no change in the Toronto scrap market. Several large sales of machinery cast, stove plate and malleable scrap were reported. In the Montreal market the demand both for domestic consumption and export is active.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	5.00
Turnings	6.00
Heavy melting steel	7.50

TORONTO

Steel axles	14.00
Iron axles	16.00
Heavy melting steel	9.50
Turnings	7.00
No. 1 mach. cast (net)	15.00
Malleable (net)	13.00

Steel Bookings in First Drop Since May

Unfilled bookings of the United States Steel Corp. as of Nov. 30 amounted to 3,673,000 tons, a drop of 78,030 tons, or approximately 2.8 per cent. This is the first decline since May. A comparative statement follows:

Date	Total	Change, tonnage	Change, per cent	
Nov. 30, 1928	3,673,000	78,030—	2.8	—
Oct. 31, 1928	3,751,030	52,662+	1.42	+
Sept. 30, 1928	3,698,368	74,325+	2.05	+
Aug. 31, 1928	3,629,042	53,116+	1.4	+
July 31, 1928	3,570,927	66,082—	1.81	+
June 30, 1928	3,637,009	220,187+	6.45	+
May 31, 1928	3,416,822	455,311—	11.7	—
Apr. 30, 1928	3,872,133	463,073—	10.7	—
Mar. 31, 1928	4,335,206	62,983—	1.43	—
Feb. 29, 1928	4,398,189	122,242+	2.8	+
Jan. 31, 1928	4,275,947	303,073+	7.62	+
Dec. 31, 1927	3,972,874	518,430+	15.	+
Nov. 30, 1927	3,454,444	113,404+	3.39	+
Oct. 31, 1927	3,341,040	192,921+	6.1	+
Sept. 30, 1927	3,148,113	47,924—	1.49	—
Aug. 31, 1927	3,196,037	54,023+	1.7	+
July 31, 1927	3,142,014	88,768+	2.8	+
June 30, 1927	3,053,246	2,305+	0.075	+
May 31, 1927	3,050,941	405,191—	11.7	—
Apr. 30, 1927	3,456,132	97,008—	2.72	—
Mar. 31, 1927	3,553,140	43,979—	1.22	—
Feb. 28, 1927	3,597,119	203,058—	5.34	—
Jan. 31, 1927	3,800,177	160,792—	4.5	—
Dec. 31, 1926	3,960,969	153,522+	4.1	+
Nov. 30, 1926	3,807,447	123,786+	3.36	+

Indian Motorcycle Co., Springfield, Mass., is beginning to build a moderate-priced airplane motor.

Semifinished

Consumers Slow in Contracting for First Quarter—Specifications Fairly Active

CONSUMERS of sheet bars, billets and slabs are placing orders cautiously for first quarter, but new business going on makers' books is at better prices than obtained in fourth quarter. Some users have repeated their arrangements with mills, for shipments at current prices, while others have purchased only for January. Specifications on remaining fourth quarter contracts are liberal.

SEMIFINISHED STEEL PRICES, PAGE 1516

Pittsburgh, Dec. 11.—First quarter contracting for semifinished material is slow. Makers are firm at $34 for sheet bars but buyers appear reluctant to sign. Rerolling billets and slabs hold at $33 for the 4 x 4-inch size with the smaller material $1 higher. Wire rods continue $42, being unaffected by the recent increase in wire products. Specifications have been well maintained but are beginning to reflect some decline in strip operations.

Cleveland, Dec. 11.—Some additional contracts for sheet bars, billets and slabs have been placed with a Cleveland maker at $34, Cleveland or Youngstown basis, depending on point of delivery. Specifications are a little slower, but this interest continues to operate at full capacity. Wire rods are unchanged for first quarter at $42, Pittsburgh and Cleveland.

Youngstown, O., Dec. 11.—Consumers are becoming more interested in the market for sheet bars, slabs and billets. Some fair size inquiries are out in this market. Billets and slabs are held at $33, Pittsburgh and Youngstown, while sheet bars continue to bring $34, same bases. Books have been opened for wire rods for first quarter at unchanged quotations, $42, Pittsburgh and Cleveland, and $43, Chicago.

Frame Patent Suit Reply

New York, Dec. 11.—United States Steel Corp. attorneys are now preparing an answer to the Bethlehem Steel Co.'s suit, alleging infringement of its Grey structural mill patents. The reply will be ready within 30 days.

The Smith Engineering Works, Milwaukee, has shipped four stone crushers, weighing a total of 175,000 pounds, to South America, for use by the Central Cordoba Railway Co., Buenos Aires.

Bars

Heavy Demand Continues as Consumers Order Out Tonnages —Deliveries Are Deferred

CONTINUANCE of prices into first quarter has prevented a rush of buying but consumers are taking heavy tonnages of soft steel bars for their needs. At Chicago automotive and agricultural implement needs are heavy. Users generally are specifying only what they need for current use. In the West deliveries are falling back after mills had caught up part way on order books.

BAR PRICES, PAGE 1515

Chicago, Dec. 11.—Bar mills here are getting heavier schedules from automotive parts manufacturers, in line with plans for general increases in automobile production in the next 30 to 45 days. Parts makers are ordering out considerable material for the remainder of this month. Largely as a result of this activity bar mill shipments again have been lengthened to three to five weeks. Several mills are running close to capacity, and average bar mill operations are about 85 per cent. The momentum of farm implement and tractor specifications is well maintained.

Mills are booking soft steel bar tonnage for part or all of first quarter at 2.00c to 2.10c, only tonnage buyers getting the benefit of 2.00c. No formal announcement has been made of the extension of the existing price range for first quarter, and it is understood mills seek to encourage buyers to cover for actual orders at hand as much as possible. It has become customary for many buyers to specify more closely for material as needed rather than order out finished steel covering estimated operations for a quarter. Inquiry for first quarter, however, is active.

Pittsburgh, Dec. 11.—Hot-rolled merchant steel bar demand reflects the usual December lull, with consumers continuing to specify only for material needed in current operations. Some decline is noted in buying compared with the first of this month and mills are fairly well caught up on shipments. The fact that first quarter prices are unchanged from current levels of 1.90c to 2.00c, Pittsburgh, restricts forward buying.

Buffalo, Dec. 11.—Consumers show increased interest in first quarter bars. Some desirable business has been placed at 2.10c, delivered, Buffalo. Output will be reduced next week but not to the usual extent of the pre-holiday season.

Detroit, Dec. 11.—Continuation of current prices on soft steel bars into the first quarter is making the transition from the fourth to the first quarter indistinguishable. Some makers are insisting upon receiving specifications against fourth quarter contracts prior to Dec. 15 in order to make a fresh start on the first quarter. Demand for bars is spotty, some makers being down for inventory and model changes and others being ready to resume production on new models. December shipments, while below those of November and October, remain seasonably high. Generally, the market is 1.90c to 1.95c, Pittsburgh, but Cleveland producers of bars are quoting these levels on a Cleveland base.

Cleveland, Dec. 11.—Outside mills report considerable progress in signing up first quarter contracts on soft steel bars. Prices usually are 1.90c to 1.95c, Pittsburgh or Cleveland. One tonnage taken at 1.95c, Cleveland, recently involved 1000 tons of one size. The 2.00c, Pittsburgh, and 2.05c, Cleveland, maximum figures have only been procured in rare instances on small lots.

Philadelphia, Dec. 11.—Steel bar demand continues brisk, and bookings by some mills average higher than in October and November, an unusual condition. Prices are firm at 1.90c to 2.00c, base, Pittsburgh.

Youngstown, O., Dec. 11.—Considerable additional steel bar business has come to local mills within the past several days, largely from the agricultural implement and general trade. Independent bar mills have stepped up their activities to 70 per cent, against 60 per cent at which they have been running for the past several weeks. Bars are holding at 1.90c to 2.00c, Pittsburgh.

South Gets Car Plant

Chicago, Dec. 11.—The Pullman Car & Mfg. Corp. has purchased the car building equipment of the Tennessee, Coal, Iron & Railroad Co., at Birmingham, Ala. Arrangements are being made to obtain a site in the Birmingham district and build a plant.

Illinois Solderless Connector Co., 312 North May street, Chicago, has increased its capital from $10,000 to $75,000.

Plates

Demand Heaviest in Eastern District—10,000 Tons Pending for Southwestern Oil Storage

PLATE demand is unusually high for this time of the year in eastern districts where large inquiries recently have developed for ship and pipe line material. About 10,000 tons of plates is pending at Chicago for oil storage tanks in the southwestern fields. The week's awards include 3600 tons of plates for two car ferries for the Pere Marquette railroad.

PLATE PRICES, PAGE 1515

New York, Dec. 11.—Preferential prices on plates which have been hanging over from third quarter are being withdrawn. While the general price level is unchanged, preferential prices show some signs of being raised. Preferential prices are becoming more exceptional. The usual market continues 1.90c to 2.00c, base, Pittsburgh, or 2.05c to 2.15c, base, Coatesville, the latter range being equivalent to 2.22½c to 2.32½c, delivered New York. Miscellaneous demand continues good, although not up to the volume of October and November. Plans and specifications are expected out next week on a 4500-ton steel plate pipe line in Brooklyn. The Atlantic, Gulf & West Indies Steamship Co. is in the market for two boats expected to require about 4500 tons of steel each.

Pittsburgh, Dec. 11.—Tank and line pipe work is providing mills with a fair volume of plate business although demand is tapering off. Business is seasonably high, nevertheless. First quarter contracts are being signed at 1.90c to 2.00c, unchanged from currently prevailing prices.

Cleveland, Dec. 11.—Plate specifications and new orders are diminishing. Occasional lots of 200 to 600 tons are ordered by ship repair yards. Two car ferries for the Pere Marquette have been ordered from the Manitowoc Shipbuilding Co. requiring 3600 tons. Occasional orders for dished or flanged heads involve fair size plate tonnages. One company has ordered 300 gasoline station tanks of 10-foot diameter. Contracting for first quarter is meager but 1.90c to 1.95c, Pittsburgh, will be the usual figures.

Chicago, Dec. 11.—Miscellaneous manufacturing lines and makers of light boilers and heating plants are specifying for steady tonnages of plates, but oil tank awards are light. One mill has booked about 1500 tons for oil storage work, and about 10,000 tons of plates are on inquiry, largely from the Southwest. Mills rolling heavier plates have light schedules. Inquiry for plates is active for first quarter. Car building

specifications have gained no volume thus far. Some tonnage covering part or all of first quarter is being placed on books for miscellaneous buyers on the basis of 2.00c to 2.10c, Chicago.

Philadelphia, Dec. 11.—Eastern platemakers continue to book good tonnages, and some of them still are operating at 75 to 80 per cent which is not far under the peak of the year. Current demand is unusual for this time of the year. Prices generally are 2.05c to 2.15c, base, Coatesville, although on larger tonnages $1 or $2 a ton less is being done in some instances.

CONTRACTS PLACED

3600 tons, two car ferries, Pere Marquette railroad, to Manitowoc Shipbuilding Co.
372 tons, dam control gates, Leaburg project, Eugene, Oreg., to Willamette Iron & Steel Works.
180 tons, two sulphide digestors for Oregon plants, to Willamette Iron & Steel Works.

CONTRACTS PENDING

10,000 tons, oil storage work for undisclosed interests in Southwest oil country.
250 tons, 2,000,000-gallon steel tank for the Marin municipal water district, San Rafael, Calif. Bids Dec. 18.

Steel Rate in Valley Is Slightly Higher

Youngstown, O., Dec. 11.—Somewhat higher rates of steelworks operations are noted this week, with finishing mills going at about unchanged rates. While sheet mills are slightly off, yet steel bar and pipe mills have increased rates. Three independent open-hearth units have been added to the active list, making 44 active this week out of an available total of 51, against 41 last week. Independent bessemer operations are at 60 per cent.

Carnegie Steel Co. is unchanged at 80 per cent. Fourteen independent pipe units are operating this week out of 20 welded and seamless units, a gain of two. Independent bar makers are 70 per cent active, against 60 last week. Out of 127 independent sheet units, 106 are running this week against 113 last week, but others may go on later this week. Strip and independent tin mill operations continue at capacity, the Steel corporation tin mill subsidiary continuing at 80 per cent.

Plan Scrap Arbitration

New York, Dec. 11.—The Institute of Scrap Iron and Steel Inc. has set up the machinery for arbitraitng disputes in the scrap industry, said to be the first of its kind. An arbitration committee and an arbitration panel have been created and rules of arbitration adopted. Each party to a dispute will select a representative from the national panel and the director general of the institute—Benjamin Schwartz—will be chairman.

Pipe

French Sellers Underbid American Makers—1200 Tons Let in East—Good Inquiries Up.

CAST pipe interest grows. Pawtucket, R. I., has let 1200 tons. French bidders are low by $1.52 per ton on part of Detroit's 5700-ton requirement. Four projects are pending in the East, involving about 2000 tons. Racine, Wis., is in the market for 1850 tons. Some lettings and inquiries are noted, too, in the West. Prices show more strength. Steel pipe sales are desultory.

PIPE PRICES, PAGE 1516

Chicago, Dec. 11.—Winter business in cast iron pressure pipe looks promising. Fresh inquiries are appearing including some feelers not yet in definite form. Racine, Wis., took bids Dec. 10 on 1850 tons of 6 to 16-inch pipe for 1929. The strengthening of prices in the East encourages sellers here. Bids by the sellers of French pipe on 5700 tons of large-sized pipe for Detroit were about $1.52 per ton below domestic quotations. Quotations are regarded as firm in this district at $45.20 to $46.20, delivered Chicago, for the larger diameters.

Boston, Dec. 11.—Prices for pipe now show the advance expected to develop before the year's end. For 4-inch pipe $47.10 to $48.10 is now received, delivered at common Boston freight rate points, while for 6-inch and larger $44.10 to $45.10 rules. The customary $3 differential continues to apply on all class A and gas pipe orders. The largest contract closed in the week was for 1200 tons by Pawtucket, R. I., and went to a local concern. It is understood that the Warren Foundry & Pipe Co. will furnish the pipe.

New York, Dec. 11.—Cast pipe business continues to develop slowly. One eastern seller here has advanced prices $3 to $4 a ton to $41.60, New York, on 6-inch pipe and over, with 4-inch pipe $3 above this level.

Pittsburgh, Dec. 11.—Some decline is noted in demand for merchant steel pipe although business still is at a high seasonal level. The practice of jobbers of maintaining minimum stocks prevents the inventory-taking period from reflecting a further substantial decline in business in this direction. Line pipe is quiet, both in awards and inquiry, although several jobs still are pending on which action is anticipated within the next few weeks. Wrought iron pipe is in a seasonal lull.

Cleveland, Dec. 11.—Merchant steel pipe buying by jobbers is fair. Occasional orders for one or two carloads at a time are placed. Some of the larger jobbers somtimes order two or three times per week.

Milwaukee, Dec. 11.—Milwaukee is asking bids Dec. 28 on approximately 9000 tons of 6 to 16-inch class C pipe and special castings. Quantities are as follows: 2500 tons 6-inch, 2700 tons 8-inch, 1800 tons of 12-inch and 1500 tons of 16-inch; 400 tons of 6 to 16-inch special castings; 50 tons of offsets and 11¾ tons of special tapping sleeves and clamps; total, 8961¾ tons.

Birmingham, Ala., Dec. 11.—Production of cast iron pipe is a trifle above 50 per cent. Some shops, however, operate day and night in one or more departments. Only a few lettings were reported recently. Indications are that winter activities and production will probably be better than last year. Pressure pipe prospects are bright for 1929.

CONTRACTS PLACED

1200 tons, Pawtucket, R. I., to a local company, which probably will obtain the pipe from the Warren Foundry & Pipe Co.
200 tons, 6 and 8-inch pipe for Deerfield, Ill., awarded through contractor, to unstated interest.

CONTRACTS PENDING

13,000 lineal feet of 6 and 8-inch cast iron water mains in improvement No. 179 by Cuyahoga county board of commissioners, Cleveland. Bids close Dec. 19.
5700 tons, 24, 36 and 48-inch pipe for Detroit, James B. Clow & Sons low on a portion at $40.65, delivered; United States Cast Iron Pipe & Foundry Co. low on a part at $41.42, delivered; and French sellers low on 2800 tons at $39.90, delivered.
1850 tons, 6, 8 12 and 16-inch pipe for Racine, Wis.; bids Dec. 10.
850 tons, gas pipe, for Long Island Lighting Co.; bids asked through E. L. Phillips, 30 Church street, New York.
700 tons, miscellaneous sizes of water pipe, Stamford Water Co., Stamford, Conn.
548 tons, 2 to 12-inch class B pipe, improvement, Arlington street, Los Angeles. Wilbur N. Edgley, low bidder.
323 tons, 4 to 8-inch class B pipe, Burbank, Calif. Bids opened.
300 tons, 8-inch class C pipe, Yonkers, N. Y.; bids close Dec. 13.
100 tons, cast pipe, Mamaroneck, N. Y.

Jewett Is Awarded Medal

Dr. Frank B. Jewett, vice president, American Telephone & Telegraph Co., New York, has been awarded the Edison Medal for his contributions to the art of electrical communication. The Edison Medal was founded by associates and friends of Thomas A. Edison, and is awarded annually for meritorious achievement in electrical science, art or engineering by a committee consisting of 24 members of the American Institute of Electrical

Engineers. Dr. Jewett was instrumental in working out methods which led to the introduction in telephone service of phantom loading, loading of large gage and open-wire circuits, the practical use of telephone amplifiers and the development of phantom duplex cables.

Tin Plate

Consumers Signing for First Half—Operations Increased

TIN PLATE PRICES, PAGE 1515

Pittsburgh, Dec. 11.—Contracting for tin plate for first half is well along, and most users have signed up at $5.35, base, Pittsburgh. Operations have increased, some interests running full with the general average for the district at 85 per cent. Most mills have several weeks' business ahead of them. Contracts indicate tonnage in the first half of 1929 will at least equal the corresponding period of 1928. The normal increase in tin plate consumption, about 8 per cent annually, may bring 1929 tonnage above this year's total.

Organize New Chapter

Initial steps toward the organization of a Milwaukee chapter of the American Welding society were taken at a meeting of 37 representatives of 22 Milwaukee industries. I. A. McIntyre, Milwaukee Steel Foundry Co., was chosen temporary president, and W. E. Van Dreser, C. H. Hollup Corp., temporary secretary. S. H. Smith, manager of the Milwaukee branch of the Universal Oxygen Co., who initiated the movement, was appointed chairman of the membership committee. A second meeting will be held Dec. 18 to effect a permanent organization of the chapter.

Coals Are Classified

Bituminous and anthracite coals, lignites and peat are classified according to the Parr system of coal classification in a recent publication of the engineering experiment station of the University of Illinois, Urbana, Ill. Samuel W. Parr is the author of this 62-page booklet known as bulletin 180 of the engineering experiment station. The major portion of the work is a tabular classification of the coals with regard to locality from which obtained, moisture, volatile content, fixed carbon, ash, sulphur and other qualities.

To Argue Mileage Scale

Washington, Dec. 11. — Interstate commerce commission announced today it will hear oral arguments Jan. 3 and 4 in connection with part 6, docket 17,000, in which the examiner recommended a mileage scale for iron and steel freight rates in central classification territory and New England. The iron and steel rate cases merged with the general proceeding also will be heard at this time.

Sheets

Specifications Heavy as Old Contracts Expire—Auto Industry Placing First Quarter Tonnage

SOME reflection of strength in the market is noted in the fact specifications are the heaviest in years for December. Consumers are taking all the material due them on fourth quarter contracts, as Dec. 15 has been set by mills as the limit for receiving specifications. On new business the advance of $2 applies. Automobile manufacturers are placing orders for delivery in the first quarter.

SHEET PRICES, PAGE 1515

Pittsburgh, Dec. 11.—Sheet specifications are the heaviest in years for this period. Consumers are active in closing old contracts which require specifications by Dec. 15. Shipments of some of this tonnage probably will lap over a few weeks into the new year, but on any material for which shipments after Jan. 1 are specifically requested by customers the $2 advance will be applied. Demand from the automotive industry reflects the usual December lull but other consuming lines are active buyers, particularly agricultural implement makers. This industry gives indications of establishing a record in sheet consumption this year. Contracting for first quarter, although not actively solicited by mills, is unusually large. Mills report new business is being taken at the higher prices, or $2 a ton above fourth quarter contract levels. These prices are 2.85c, base, Pittsburgh, for sheet mill black, 3.00c for tin mill black, 3.60c for galvanized, 2.10c for blue annealed, and 4.10c for autobody. Operations are maintained at better than 90 per cent. Three to four weeks generally are required by mills in making shipments on current business. Some grades of blue annealed sheets can be delivered in ten days.

Buffalo, Dec. 11.—Buyers of automobile and special grades of sheets find some producers booked solid for January. Advance sales of other grades are satisfactory. Current prices are: Black, 2.85c, base Pittsburh, galvanized, 3.60c and full finished, 4.10c. Shipments are being retarded at the request of some consunmers.

Cleveland, Dec. 11.—Sheetmakers believe first quarter tonnage will equal and in some cases exceed any quarter of 1928. The new arrangements are on a basis $2 higher than fourth quarter. The present quarter's tonnage probably will be taken out by Dec. 15. Customers have resumed their acceptances of tonnage after curtailing for inventories. Delivery dates in February are being named by some makers on full finished, deep drawing and other highly finished sheets. Inspection of these grades is severe and more time is required for processing.

Youngstown, O., Dec. 11.—Despite the expected preinventory lull in new purchases of sheets, mill operations in this district are much more satisfactory than anticipated. Independent mills are at 83 per cent this week against 89 per cent last week, but several additional units may start later. Mills hope to clean up fourth quarter orders by the end of the year, Autobody sheetmakers now are beginning to receive good orders for first quarter. Some mills are planning to shut down for repairs in the Christmas week. Prices are firm at 2.85c, Pittsburgh, for black, 4.10c for autobody, 3.60c for galvanized and 2.10c for blue annealed, Pittsburgh bases.

Philadelphia, Dec. 11.—Sheet specifications continue heavy, with some mills reporting averages higher than in October and November. Little contracting for fourth quarter is noted, although the new prices appear firm.

Detroit, Dec. 11.—Sellers of sheets claim progress in establishing higher prices for the first quarter. At least one of the larger users has accepted 2.85c, Pittsburgh, for black, 2.00c for blue annealed, and 4.10c for autobody, these prices being $2 higher than for the current quarter. Some users, while refraining from committing themselves, are not pressing as vigorously as in the past for concessions. The Ford Motor Co. has not yet acted on its first quarter requirements. Blue annealed is less firm than other grades. December shipments of sheet into the Detroit district show a moderate decline from November but every indication still points to an extremely active first quarter.

Chicago, Dec. 11.—Moderately heavy buying continues in steel sheets. Producers are gratified at the diversity of business. Blue annealed backlogs continue three to four weeks. Chicago delivered prices now are 3.00c to 3.10c for No. 24 black, 3.75c for No. 24 galvanized, and 2.25c for No. 10 blue annealed. Inland Steel Co. is naming a flat price of 3.00c for black sheets.

St. Louis, Dec. 11.—Specifications and new buying in sheets continue to exceed expectations of producers and distributors. Recent equipment orders have stimulated the demand. Purchasing by the general manufacturing trade is in good volume. Prices are steady.

Atlas Approves Merger

Dunkirk, N. Y., Dec. 11.—Stockholders of the Atlas Steel Corp. have approved plans for acquisition of the company's properties, excepting those in Canada, by the Ludlum Steel Co.

Structural Shapes

Remainder of Year Contains Bright Prospects for Fabricators—First Quarter Contracts Extended at Unchanged Figures

PROJECTS coming up for closing between now and the end of the year, presage a fair degree of activity. Inquiries involve such tonnages as 6500 tons at Buffalo, 5000 tons at Chicago, 6500 tons at Akron, O., and numerous smaller amounts in scattered sections. Buying appears to be above the usual average for this season with several jobs within the 1000 to 5000-ton range having reached the closing stage this past week. Small industrial construction prospects are bright at Pittsburgh and in the West and Northwest. First quarter contracts are for the most part being accepted at unchanged figures 1.90c to 2.00c, Pittsburgh. Fabricators are holding down their specifications for jobs in hand or in immediate prospect, not wishing unduly to enlarge their inventory stocks.

STRUCTURAL SHAPE PRICES, PAGE 1515

New York, Dec. 11.—Featuring eastern awards in structural shapes is a 5200-ton lot for an office building. Buying generally is light, although inquiry maintains a fairly high volume. The structural board of trade reports 27,756 tons let in the metropolitan district in November, exclusive of piers, bridges, etc. This is the lightest since February when 24,850 tons was the aggregate. The November tonnage did not, of course, include the 26,500-ton Kill Van Kull bridge. While 2.195c to 2.245c, New York, is the ruling range, this is being shaded in special instances.

Philadelphia, Dec. 11.—Shape demand has improved somewhat. Eastern shape mills operate at 75 to 80 per cent. While current bookings are small, fabricators occupy a comfortable position, some having work sufficient to keep them occupied two to three months. Structural tonnage now being figured is the largest before the trade in a long time, hence the outlook for the first quarter is particularly bright. Shape prices continue to reflect a few irregularities nevertheless the market shows a firmer tone than in the third quarter. The current market is around 2.00c to 2.11c, delivered Philadelphia.

Pittsburgh, Dec. 11.—Specifications for plain structural material, fairly active for this time of the year, show a decrease when compared with demand a short time ago. Awards continue restricted to small lots. Fabricators gradually are working off old business. Inquiry is well maintained, including a good volume of industrial construction work. New contracts for plain material are being signed at unchanged prices of 1.90c to 2.00c, Pittsburgh.

Buffalo, Dec. 11.—Demand for structural steel is above average proportion for this season. Two jobs totailng 500 tons were let. Plans for the new Buffalo municipal building are being revised to reduce the cost, roughly estimated at $6,000,000, the structural tonnage inolved, 6500 tons or more, will not be affected materially by the changes. Bids will be asked early in 1929.

Cleveland, Dec. 11.—Three bridges—446 tons, 290 tons and 209 tons, respectively—feature structural awards. The first, one for the Detroit, Toledo & Ironton railroad at Delta, O., went to McClintic-Marshall Co. The second, the New York Central bridge over West 117th street, was let to an unidentified interest and the last, the East Thirty-seventh street bridge for the Cleveland Union Terminals Co., went to the Bethlehem Steel Co. Otherwise, lettings are slow and inquiries few, although the Akron, O., hangar job is up for opening of bids tomorrow. First quarter contracting has made little or no progress but quotations are unchanged at 1.90c to 1.95c, Pittsburgh, the usual figures and with 2.00c quoted on fractional tonnages.

Chicago, Dec. 11.—Building work for the Chicago district, the West and the Northwest is promising much for the next 90 days. Fabricators are entering mill specifications largely for individual projects. In a number of cases, the present quotations of 2.00c to 2.10c, Chicago, are being extended into first quarter on tonnage sales, despite no definite announcement from the mills as to prices for that period. About 400 tons of structurals have been awarded, mostly in lots under 1000 tons each.

Awards Compared

	Tons
Awards this week	18,348
Awards last week	61,045
Awards two weeks ago	71,989
Awards this week in 1927	34,850
Average weekly awards, Nov.	46,227
Average weekly awards, 1928	40,238
Total awards to date, 1927	1,766,413
Total awards to date, 1928	1,971,662

CONTRACTS PLACED

5200 tons, 30-story office building, Seventh avenue and Thirty-ninth street, New York, to Hay Foundry & Iron Works, through Shroder & Koppel, general contractors.

1265 tons, One Hundred Twenyt-fourth Field Artillery armory, Chicago, to Mississippi Valley Structural Steel Co.

1000 tons, smelter building for American Smelting & Refining Co., at Rosita, Mexico, to Ingalls Iron Works.

1000 tons, apartment, East Seventy-second street, to Hay Foundry & Iron Works, through George A. Fuller, general contractor.

950 tons, apartment 4, East Seventy-esecond street, New York, to Hay Foundry & Iron Works.

825 tons, auditorium, Flint, Mich., for Industrial Mutual association; to American Bridge Co. Noted in issue of Nov. 29 as going to the Flint Structural Steel Co.

800 tons, office building, Niagara Falls, N. Y., to McClintic-Marshall Co.

700 tons, factory addition, Allis-Chalmers Mfg. Co., West, Allis, Wis., to American Bridge Co.

700 tons, Stone & Webster power plant, Washington state, to Pacific coast fabricator.

570 tons, Clark's Fork bridge, Paradise, Mont., to Virginia Bridge & Iron Co. Noted last week as going to unstated interest.

530 tons, ore bridge, South Chicago, Ill., to Mead-Morrison Mfg. Co.

500 tons, bins and sheds at plant of the Quaker Oats Co., St. Joseph, Mo., to St. Joseph Structural Steel Co.

500 tons, bridge work, Wisconsin, to Wisconsin Bridge & Iron Co.

495 tons, bridge, New York Central, West Toledo, O., to McClintic-Marshall Co.

446 tons, bridge, Detroit, Toledo & Ironton railroad, Delta, O., to McClintic-Marshall Co.

375 Losonia club, Green Lake, Wis., to Vulcan Mfg. Co.

370 tons, addition, Buffalo state hospital, to Kellogg Structural Steel Co.

350 tons, J. G. McCrory Co. store, Milwaukee avenue, Chicago, to Duffin Iron Co.

350 tons, high school, Pleasantville, N. J., to McClintic-Marshall Co.

300 tons, highway bridge, Delton, Wis., to unstated fabricator.

294 tons, main building, William and Mary college, Williamsburg, Va., to unstated interest.

290 tons, bridge over West 117th street, Cleveland, New York Central railroad, to unstated interest.

250 tons, hotel, Atlantic City, N. J., to McClintic-Marshall Co.

209 tons, East Thirty-seventh street bridge, Cleveland for Cleveland Union Terminals Co., to Bethlehem Steel Co.

200 tons, addition, American Cast Iron Pipe Co., Birmingham, Ala., to Southern Steel Works Co.

200 tons, Baltimore & Ohio railroad bridge, to Fort Pitt Bridge Works.

190 tons, Outlook bldg., Santa Monica, Calif., to Baker Iron Works.

180 tons, addition, National Carbon Co., Niagara Falls, N. Y., to R. S. McMannus Steel Construction Co.

150 tons, building Y. W. C. A., Washington, Pa.; to Guibert Steel Co.

150 tons, Grace cathedral, San Francisco, to Judson-Pacific Co.

150 tons, dairy building, Wawa, Pa., to Shoemaker Bridge Co.

129 tons, machine shop, storeroom, office building, Atlas Portland Cement Co., Waco, Tex., to unstated interest.

115 tons, turbine supports, W. S. Barstow association, Philadelphia, to Belmont Iron Works.

100 tons, shop building for Texas & Pacific railroad, Macks, Tex., through the Austin Co., general contractor, to Virginia Bridge & Iron Co.

100 tons, miscellaneous work, including steel for airport building, Alliance Aircraft Corp., Alliance, O., to Alliance Structural Co.

100 tons, Market building, San Jose, Calif., to Golden Gate Iron Works.

Unstated tonnage, steel for Russell Erskine

hotel, Huntsville, Ala., to Decatur Steel & Iron Co.

CONTRACTS PENDING

10,000 tons, internal revenue building, Washington.' Previously noted as 17,000.
10,000 tons, Pennsylvania railroad office building, Philadelphia.
6500 tons, municipal building, Buffalo. Plans being revised to reduce costs. Bids in the spring.
6000 tons, Reading railroad, grade crossing elimination work, Philadelphia.
5000 tons, Rosenwald industrial museum, Jackson park, Chicago, revived.
1000 tons, Pitkin theater, Brooklyn, bids asked by Thompson Starrett Co.
900 tons, press building *New York Evening Journal*, 318 East Thirty-ninth street, New York.
600 tons, highway bridge, Baltimore.
500 tons, power plant, American Cyanamide Co., Warners, N. J.
450 tons, service station and showroom, Yonkers, N. Y.
375 tons, office building, Swift & Co., Chicago.
300 tons, Home for the Aged, Eighty-eighth street, New York.
150 tons, Trinity college building, Hartford, Conn.
100 tons, Westwood bank, Westwood, N. J.
Tonnage unstated, state normal school, Trenton, N. J.
Unstated tonnage, incinerator plant, Brooklyn Ash Removal Co., Avenue J, Brooklyn, N. Y.

Discuss Early History of Chromium Steel

"Early History of Chromium Steel and Ferrochromium" was the topic of discussion at the regular monthly meeting of the New York chapter of the American Society for Steel Treating at the Merchants' association headquarters in the Woolworth building, New York, Dec. 10. C. E. Meissner, development engineer, Chrome Steel Works, Carteret, N. J., and E. E. Thum, associate editor of *Iron Age*, New York, lead the discussion. Mr. Thum confined his remarks largely to the utilization of chromium steel in the main arches of the Eads bridge across the Mississippi, at St. Louis. The bridge, built between 1870 and 1874, was said to be the first in America to use steel in its structural members, and the first anywhere to use alloy steel. Mr. Meissner traced developments from the days of the Civil war when the Chrome Steel Works of Brooklyn was organized. It was said the Brooklyn concern was the first to produce commercially steels alloyed with chromium.

Imports Are Light

Philadelphia, Dec. 11.—Iron and steel and related imports at the port of Philadelphia were unusually light last week. They comprised 21 tons of steel scrap from Germany, 8 tons of steel scrap from the United Kingdom, 9 tons of steel billets from Sweden and 12 tons of galvanized steel strips from the United Kingdom.

Chromium plating was discussed before the Worcester, Mass., branch of the American Society of Mechanical Engineers, Dec. 6. Dr. William Blum of the bureau of standards, Washington, was the principal speaker.

Concrete Bars

Prices Stronger at Chicago —Awards More Numerous Than Last Week

QUOTATIONS are undergoing clarification in concrete bars, particularly in Chicago. Awards remain at recent low levels in most sections, although lettings of 850 tons in Boston, 300 tons at St. Louis and a few others elsewhere augment this week's total. Inquiries pending include a 2000-ton sewer project at St. Louis and 400 tons for a New York subway.

REINFORCING BAR PRICES, PAGE 1515

Pittsburgh, Dec. 11.—Awards of concrete reinforcing bars hold to the low level of preceding weeks. Mills, however, continue to receive a fair volume of business, made up generally of small orders, interspersed with an occasional large tonnage. Little improvement in demand from distributors, however, is looked for until the end of the inventory-taking period although the outlook for next year is regarded as favorable. Prices continue at 2.25c, Pittsburgh, for cut lengths and 2.00c for stock lengths.

Boston, Dec. 11.—Reinforcing steel for the United Shoe Machinery Corp. building involving approximately 850 tons, has been awarded to the E. A. Tucker & Co. The steel will be supplied in limited tonnages over an extended period. Odd tonnages, totalling about 150, comprised the bulk of other business. The contract for 150 tons for an addition to the Massachusetts General hospital, here is deferred. General contract bids will close this week.

Buffalo, Dec. 11.—The Kalman Steel Co. was awarded 125 tons of reinforcing bars for the Harrison Radiator addition at Lockport, N. Y. This leaves approximately 500 tons outstanding in inquiries in this district. Signs point to small sales and shipments the rest of December. Small lots are being delivered locally at 2.615c.

Cleveland, Dec. 11.—Awards in concrete bars for 10 days or two weeks, have been confined to inconsequential tonnages. Prospects are bright for larger work reaching the closing stage shortly after Jan. 1. One of the largest tonnages to come up in many weeks is in connection with the Akron, O., hangar for the Goodyear-Zeppelin Corp., 400 tons reported let to the West Virginia Rail Co.

Chicago, Dec. 11.—Several billet reinforcing bar fabricators will withdraw old prices as of Dec. 15, and will quote only the new minimum of 2.35c, Chicago, for carload lots. Rail steel reinforcing bar sellers will hold as a minuimum a differential price $6 a ton under the billet bar price. The price of 2.00c to 2.10c prevails on 40 to 60-foot mill lengths of billet bars at the mills. Inquiry is active especially for small lots.

St. Louis, Dec. 11.—Concrete bars, 300 tons, for the Deaconess hospital here, will be furnished by the Laclede Steel Co. The general contract for a sewer project to require 2000 tons was let to W. E. Callahan Construction Co.

Awards Compared

	Tons
Awards this week	4,602
Awards last week	1,521
Awards two weeks ago	5,067
Awards this week, 1927	7,759
Average weekly awards, Nov.	4,532
Average weekly awards, 1928	6,466
Total awards to date, 1927	283,649
Total awards to date, 1928	316,857

CONTRACTS PLACED

850 tons, building, United Shoe Machinery Corp., Boston, to E. A. Tucker & Co.
700 tons, store and warehouse, Sears, Roebuck & Co., Houston, Tex., to Laclede Steel Co.
600 tons, Bernal Cut project, San Francisco, to Pacific Coast Steel Co.
400 tons for Subway Section 4, Route 106, New York, to National Bridge Works, through Slattery-Baino & Co. Inc.
400 tons, hangar for the Goodyear-Zeppelin Corp., Akron, O. Understood awarded West Virginia Rail Co.
300 tons, Deaconess hospital, St. Louis, to Laclede Steel Co.
248 tons, South spillway, East Bay municipal utility district, Oakland, Calif., to Pacific Coast Steel Co.
200 tons, state highway and miscellaneous work, to Northwest Steel Rolling Mills.
173 tons, Pardee reservoir, East Bay municipal utility district Oakland, Calif., and Jackson creek spillway to Soule Steel Co.
150 tons, Massachusetts General Hospital, Boston.
131 tons, warehouse on Geary street, San Francisco for Bekins Storage Co., to Gunn, Carle & Co.
125 tons, addition, Harrison Radiator Co., Lockport, N. Y., to Kalman Steel Co.
125 tons, department store, Sears, Roebuck & Co., South Bend, Ind., to unstated fabricator.
100 tons, two apartments, Broadway and Octavia streets. San Francisco, to W. S. Wetenhall Co.
100 tons, two schools, Chicago, to Concrete Engineering Co.

CONTRACTS PENDING

8500 tons, warehouse, Delaware & Lackawanna railroad, Jersey City, N. J. Purchase turned over to Turner Construction Co. Bids close Dec. 13.
2000 tons, section of River des Peres sewer project, St. Louis; W. E. Callahan Construction Co., St. Louis, general contractor.
1000 tons for New York state hospital buildings, Orangeburg, N. Y. General contract to Niewenhaus Co., New York.
500 tons, Board of Trade building, Chicago.
500 tons, Kahn warehouse, Philadelphia.
355 tons, rest home, for Christian Science Church, San Francisco. Bids opened.
310 tons, hotel Fairfax, Calif., bids being taken.
200 tons, two schools, Cleveland board of educa-

tion, identified as Robert Fulton and Louis Agassiz schools. Being figured. Bids close Dec. 17.

113 tons, two bridges at Newport Beach, Calif. Bids Dec. 17.

100 tons, school building, Park Ridge, Ill.

100 tons, addition to state hospital for insane, Mantino, Ill.

100 tons, filtration plant and other buildings, in connection with state institution at Apple Creek, O. Bids going in.

Unstated tonnage, warehouse and terminal buildings, East Fifty-fourth street and Lake front, Cleveland, for Nicholson Universal Terminal Co., Detroit.

Talks to Foundrymen on Cupola Practice

Dr. Edward Marbaker, Mellon Institute of Industrial Research, addressed the Chicago Foundrymen's club, Dec. 8, on the results of his survey recently completed regarding cupola practice, uniformity in charging coke, oxygen control and analysis of gases in the cupola. The meeting had the largest attendance of any similar session of the club in recent years. A delegation of Milwaukee foundrymen came for the meeting by special train. Among other speakers was S. T. Johnson, president, S. Obermayer Co., Chicago, and president of the American Foundrymen's association, who advocated close co-operation between the national association and local clubs. C. E. Hoyt, executive secretary of the association, also spoke.

Fumes in Chrome Plating

Poisonous fumes, which formerly constituted the biggest obstacle to the widespread use of chromium plating by many important units in the automobile industry, have been overcome by air conditioning experts in the industry, who have made the spraying or "filming" process safe and foolproof. The pots or tanks containing the chromium are ventilated by means of large exhaust fans, which are connected to umbrella-like hoods over the tanks, and these fumes are drawn back into a special chamber, where the vapor is condensed and run back into the tank. Thus, control of the fumes by air suction not only prevents them from injuring the health of workmen, but is economic because it recovers a waste which otherwise might prove costly to the producer if completely lost.

Foundrymen See Movie

The regular December meeting of the Philadelphia Foundrymen's association Inc., was held at the Manufacturers' club, Dec. 12. Vernon Wells, representative of the Carborundum Co., Niagara Falls, N. Y., presented a moving picture entitled "Jewels of Industry," which showed the making of grinding wheels and other abrasive products.

May Buy 100 Cars

Receivers for the Chicago Railways Co., operating the north and west side surface lines in Chicago, have petitioned the United States district court in Chicago for authority to purchase 100 new street cars at an estimated cost of $1,725,000.

Rails, Cars

Rail Awards Increased—More in Prospect—Live Car Inquiries Total In Excess of 15,500

RAIL lettings continue, with lots of 50,000 and 88,800 tons being awarded and with one road adding 10,000 tons to last week's order. An additional 50,000 tons is ready for release in the West. More than 15,500 cars are pending for Lehigh Valley, Missouri Pacific, Santa Fe, Rock Island, Louisville & Nashville, Boston & Maine and New York Central. Only 609 were bought.

RAILROAD TRACK PRICES, PAGE 1516

New York, Dec. 11.—Orders for 88,800 tons of rails have been divided by the Baltimore & Ohio railroad among the Bethlehem, Carnegie and Inland steel companies. Included in the order is a 3100-ton lot of 100-pound rails for the road's terminal railroad at Chicago. The total order represents an ultimate expenditure of $3,800,000, not including track fastenings, to be placed later.

Domestic freight car awards totaling 6140 in November made that month second largest this year, being exceeded only by February when 10,200 cars were placed. Following is a comparative statement:

Jan.	4,160	14,710	8,830	1,695
Feb.	10,220	5,960	12,895	5,510
March	2,958	4,955	8,895	4,730
April	6,043	3,675	4,615	5,060
May	2,531	5,425	4,448	6,985
June	2,422	7,440	4,285	1,835
July	582	2,295	1,265	800
Aug.	677	1,181	152	2,875
Sept.	1,378	682	3,335	7,905
Oct.	2,853	886	2,840	11,145
Nov.	6,140	1,189	3,925	11,685
Total (11 mos.)	39,964	48,398	55,485	60,225
Dec.	.....	14,897	8,990	16,885
Total	.....	63,295	64,475	77,110

Inquiry for 1000 freight cars for Lehigh Valley features car demand in this district. Awards include 200 hopper cars for the Seaboard Air Line, with early action expected on 500 freight cars for Boston & Maine.

The low bid on 4500 wrought steel wheels, 33 inches in diameter for the Norfolk & Western railroad, was $24 each, base, Johnstown, Pa., or Pittsburgh, submitted by the Bethlehem Steel Co.

Chicago, Dec. 11.—Rail mills have stepped up operations 15 per cent to about 65 per cent. Missouri Pacific closed on 50,000 tons of rails, and the Wabash railroad orders, totaling 15,000 tons, have been entered. Chicago & North Western's rail order, reported last week, totals 30,000 tons instead of 20,000 tons. Inquiries for about 50,000 tons of rails for three western carriers are being prepared for release within the next week.

Track fastening tonnage totaled 15,000 to 20,000 tons for Chicago mills. About 20,000 tons are on inquiry.

Three large car equipment inquiries pending, total more than 11,000 cars, including 4631 Santa Fe, 3300 Rock Island and 3120 Missouri Pacific. Chicago & North Western is expected to ask bids for 2000 automobile cars.

Pittsburgh, Dec. 11.—General demand for track fastenings continues quiet. Mills look for no real improvement before Jan. 1. Light rails show little life and business coming from coal mining districts has been small. Rails from some mines that have been abandoned are being used by other operators. This eliminates the necessity for new purchases.

Cleveland, Dec. 11.—Rail needs of the Nickel Plate railroad for 1929 probably will reach 16,000 or 18,000 tons, against usual 12,000 tons. This inquiry is not yet out formally. The extra tonnage will be needed in connection with electrification programs to be carried out by the Cleveland Union Terminals Co. This interest has already contracted for some rails and will buy more. Hocking Valley is understood to require about 800 kegs of spikes.

CAR ORDERS PLACED

Amtorg Trading Corp., 165 Broadway, New York, 20 air dump cars, to Magor Car Corp.

Atchison, Topeka & Santa Fe, two dining cars to Pullman Car & Mfg. Corp.

Chicago & North Western, 200 ballast cars, to American Car & Foundry Co.

Detroit United railways, 120 coaches to Graham Bros.

Seaboard Air Line, 200 steel hopper cars, to Richmond Car Works.

United Fruit Growers' Express, 50 cane cars to Magor Car Corp.

Youngstown Sheet & Tube Co., 17 air dump cars, to Koppel Industrial Car & Equipment Co.

CAR ORDERS PENDING

Board of Transportation, New York, 300 subway cars contemplated; public hearing scheduled for Dec. 19.

Chicago Great Western, 300 auto, 200 box cars.

Fruit Growers' Express, 800 underframes in addition to 200 previously noted.

Lehigh Valley, 1000 cars, including 500 hoppers, 300 automobile box, and 200 gondola cars.

Louisville & Nashville, 30 coaches, contemplated.

Missouri Pacific, 3120 cars, including 1000 box cars, 1000 automobile cars, 500 hopper cars, 500 stock cars, 60 caboose cars and 20 dump cars; also 13 baggage cars, 13 combination baggage and mail cars, 11 divided coaches, two combination diner and parlor cars and one cafe club car; inquiry previously noted Nov. 29, as involving 3000 freight cars and 100 underframes.

New York Central, 100 gondolas.

Rock Island, six gasoline-electric rail motor cars. Eight more on 1929 program.

Utah Copper Co., 100 ore and 20 dump cars.

LOCOMOTIVES PENDING

Missouri Pacific, 25 switch engines.

Chicago & North Western, 10 locomotives.

Wire

General Advance of $2 Per Ton in Effect Immediately—Nail Demand Continues Slow

ALL producers of wire and nails are on a basis $2 above fourth quarter prices, the advance effective at once. Fence remains at the unchanged price. Fourth quarter specifications are being filed in full. Specifications on fourth quarter contracts will be received until Dec. 31 and on first quarter until March 31. Jobbers' stocks have been greatly reduced the past few months.

WIRE PRICES, PAGE 1516

Chicago, Dec. 11.—Western wire mills announce an advance to jobbers of $2 a ton on steel wire and wire products, in line with eastern mills, and are ready to take first quarter contracts. The new prices ignore the former mill base and publish only prices actually quoted to jobbers in the different districts. This list further gives a discount of 10 cents per 100 pounds to large jobbers and 5 cents to small jobbers. The net result is an apparent advance of $4 per ton over the former mill base, although the actual advance over the former mill price is $2 per ton. The new price on bright merchant wire is 2.65c, Chicago or western mills. Woven wire fence and posts are unchanged.

In the following table are prices published on the new basis f.o.b. Pittsburgh, Cleveland and Ironton, O. For Chicago, district mills and Anderson, Ind., $1 per ton is added, for Duluth $2 and for Worcester, Mass., and Fairfield, Ala., $3.

Standard and cement coated wire nails	$2.75
Barb wire on catchweight spools—Galv.	3.40
Barb wire on catchweight spools—painted	3.15
Polished fence staples	3.20
Galvanized fence staples	3.45
Galvanized poultry netting staples	4.60
Plain fence wire, bright hard base 6 to 9	2.60

Plus card extras for sizes, annealing, and galvanizing.

Usual differentials of 25 cents per 100 lbs. for less than carload quantities as heretofore in effect will be continued. Carload shipments will be invoiced at the price delivered destination by adding the carload rate of freight for basing point to destination prevailing at time of shipment.

New York, Dec. 11.—The general price on plain steel wire for manufacturers has been advanced $2 a ton to 2.60c, base, Pittsburgh, and all makers now are on this basis. There has been no test of the new price, but the advance is having the effect of causing buyers to specify more actively against fourth quarter contracts. The nail price has been advanced $2, and the mills now are quoting $2.75 base, Pittsburgh, Cleveland and Ironton, O., subject to a differential of $2 a ton to large jobbers and $1 to small jobbers. Nail demand continues to lag.

Pittsburgh, Dec. 11.—Leading producers of steel wire and wire products have announced a $2 advance on all material with the exception of wire fence. These prices apply on all new business between now and the end of the year and on contracts for first quarter. This brings new quotations on carload lots to jobbers to 2.60c, Pittsburgh, for plain wire and $2.75 ped 100-pound keg for wire nails, with a differential of 25 cents per 100 pounds on less-than-carload orders. Specifications against first quarter contracts will be accepted for shipment up to March 31.

Cleveland, Dec. 11.—Since the Bethlehem Steel Co., last Thursday advanced wire and wire products $2 per ton, other producers gradually have fallen into line. Some first quarter arrangements already had been made, so producers will not really reap the benefit of the advance until March 1. The new prices are $2.75, Pittsburgh, Cleveland and Ironton, O., on nails and 2.60c on plain wire. Specifications will be accepted on fourth quarter contracts until Dec. 31 for shipment at mill convenience.

Bureau of standards investigations have determined that at a temperature of about 1375 degrees Cent. the character of the surface of molten cast iron undergoes a marked change. By applying suitable corrections for this effect the optical pyrometer becomes applicable to accurate temperature measurements in the foundry.

Cold Finished Steel

Some Increase in Specifications Follows Lull

COLD FINISHED PRICES, PAGE 1515

Pittsburgh, Dec. 11.—Cold finished steel specifications show a slight increase following the recent lull. Some automotive interests are beginning to order material in preparation for increased operations. Total tonnage, as a result, is favorable for this time of the year. Contracting is fairly active, with first quarter at the unchanged price of 2.20c, Pittsburgh.

Plans 1929 Conference

The production executive division of the American Management association will hold its 1929 conference at the William Penn hotel, Pittsburgh, Feb. 27-March 1. Thomas R. Jones, Cincinnati Milling Machine Co., Cincinnati, will present a paper on the history, industrial and economic background and trend of organization. One section of the conference will be devoted to production control, inventory control, time study and similar subjects.

Strip

Eastern Markets Meet Decrease While Western Have Increase in Specifications for Hot

RESUMPTION of automotive activities, either present or prospective, has brought orders for hot-rolled strip to Chicago mills in sufficient volume to increase production. At Pittsburgh a slight decrease has been noted, attributed to inventory. Prices are being maintained and only larger tonnage buyers are able to obtain a concession of $2 from the existing schedule.

STRIP PRICES, PAGE 1516

Pittsburgh, Dec. 11.—Specifications for hot-rolled strip steel have declined slightly, although total business still is unusually high for this season. Demand is stronger from some automotive interests who are starting operations on new models. Contracting for first quarter is active with mills quoting 2.00c, Pittsburgh, for sizes under 6-inch and 1.90c for 6 1/16 to 24-inch. Only large tonnage buyers have been able to place business at a a $2 concession under these figures. On cold rolled strip 2.85c and 2.95c apply, depending upon tonnage. Operations have been fairly well maintained but backlogs are smaller than a month ago.

Chicago, Dec. 11.—Hot rolled strip mills have been forced to increase operations to care for renewed buying from automotive parts manufacturers. Mills rolling more desired sizes are operating close to capacity this week. Prices are 2.10c to 2.30c, Chicago, for hot strip under 6 inches, and 2.00c to 2.10c for material 6 to 20 inches in width.

Cleveland, Dec. 11.—After a slight decrease in the specifying rate manifesting an inventory influence, the past week witnessed a resumption. Incoming business was larger both in hot and cold. Contracting for first quarter made considerable progress at the higher level on cold but at unchanged figures on hot. Most orders for hot strips are in the narrow sizes from the stamping companies for their automotive and other customers.

Nonferrous Metals

Active Buying of Nonferrous Metals Slows Down—Shipments Against Old Orders Continue Large—Tin Prices Fluctuate

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin—New York Spot	Straits Tin—New York Futures	Lead—New York	Lead—East St. Louis	Zinc—St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
Dec. 5	16.00	16.10	15.60	51.87½	51.62½	6.50	6.35	6.35	23.90	9.87½	35.00
Dec. 6	16.00	16.10	15.60	51.00	50.50	6.50	6.35	6.35	23.90	9.92½	35.00
Dec. 7	16.00	16.10	15.60	49.87½	49.62½	6.50	6.35	6.35	23.90	9.87½	35.00
Dec. 10	16.00	16.10	15.60	50.12½	50.00	6.50	6.35	6.35	23.90	9.87½	35.00
Dec. 11	16.00	16.10	15.60	49.75	49.50	6.50	6.35	6.35	23.90	9.81¼	35.00

NEW YORK, Dec. 11.—Buying of nonferrous metals has become quiet, following large business in one metal after another all through the autumn. Shipments continue large against these orders and unfilled tonnage still is big for a month to more than two months ahead. Prices are firm and unchanged.

Tin is an exception in respect to quotations with a break of 4 cents in six market days. Some consumer buying was done on the way down, so this metal has continued active later than the others. The price had been going up rapidly on account of speculative buying in London. Output has been running ahead of large consumption.

Brass and copper rolling mills are operating at unusually high rates, especially for this season. They appear to be well booked for delivery into January, but not much interest is being shown now for later months. Prices of all products are unchanged on the basis of 16.00c, Connecticut, for ingot copper.

Copper—Buying has been unusually light in the past week for both domestic and export shipments. Shipments, however, are going out on schedule, and refineries still are in a tight position though their situation appears to be easing up slowly. The increased output of the mines is reaching the refineries, while shipments on the other hand are not quite so urgent as they were. Prices are firm and unchanged.

Tin—From the top point of 53.50c reached about a week ago on spot Straits, the highest level since early in the year, the market fell rapidly to about 49.50c Saturday. One powerful speculative faction in London was said to be selling the market down, while another, which had been supporting the price by taking stocks out of the market, was said to have withdrawn from the market. The break was so rapid it was overdone and rebounded more than ½ cent Monday noon. These events, together with the newness of the new metal exchange here, caused confusion. Yet consumers bought a good quantity of scattered positions in the past week.

Lead—Business has been large recently but much lighter in the past few days. Much of the recent buying was for December delivery, apparently showing that the market is in a sound position. Prices are firm and unchanged.

Zinc—Prime western is quiet and naturally so after the big buying

(*Concluded on Page* 1531)

Coke By-Products

Toluol Output Increases Slowly—Benzols Are In Good Demand

New York, Dec. 11.—Toluol continues in good demand with supplies scarce. Sellers assert there has been a slight increase in production as the result of the 5 cent advance in October, but that inasmuch as new equipment has to be purchased in order to expand production materially, developments along this line necessarily have been slow. Meanwhile, the market on toluol continues unchanged.

Commercial xylol and in a lesser degree, solvent naphtha also are moving well, lacquer manufacturers being forced to substitute this material for toluol in a certain degree. Prices on these products are steady.

Pure and 90 per cent benzols are firm. The rubber industry continues to cover on good quantities and an unusually good amount is being purchased for motor fuel purposes, with substantial quantities going to Europe and the British Isles.

Sulphate of ammonia is unchanged at $2.30, delivered, for material for domestic account and $2.25, port, in double bags, for export. This latter price, however, is largely nominal as foreign trading is slack; in fact, export business has been sluggish the greater part of the year.

While drug trade is feeling out the naphthalene market, preparatory to covering on its spring requirements, little business has been done.

Mill Products

Base prices cents per pound f.o.b. mill, except where otherwise specified.

SHEETS	
Yellow brass (high	20.50
Copper, hot rolled	25.00
Lead, full sheets (cut ¼c more)	9.00
Zinc sheet (100-pound base)	$9.75
Zinc strip (100-pound base)	$8.75
Aluminum, flat sheets, up to 10 gage, 3" to 72" wide	31.30
SEAMLESS TUBE	
Yellow brass (high)	25.37½
Copper	26.37½
RODS	
Yellow brass (high, full turnings)	18.25
Naval brass	21.00
WIRE	
Copper, car lots	17.62½
Yellow brass (high)	21.00

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	10.00 to 10.25
Chicago	10.75 to 11.00
Cleveland	11.00 to 11.25
HEAVY YELLOW BRASS	
Cleveland	8.25 to 8.50
ZINC	
New York	3.50
Cleveland	3.25 to 3.50
HEAVY COPPER AND WIRE	
New York	13.00 to 13.25
Boston	12.75 to 13.00
Chicago	13.00 to 13.25
Cleveland	13.00 to 13.25
RED BRASS BORINGS	
New York	9.50 to 9.75
YELLOW BRASS TUBING	
Cleveland	8.25 to 8.50
LIGHT COPPER	
New York	11.25 to 11.50
Chicago	11.00 to 11.25
Cleveland	11.50 to 11.75
LIGHT BRASS	
Boston	6.25 to 6.50
Chicago	7.50 to 7.75
Cleveland	6.50 to 6.75
ALUMINUM	
Clippings, Cleveland	17.75 to 18.00
Borings, Cleveland	9.25 to 9.50
Cast, Cleveland	12.75 to 13.00
Cast, Boston	10.50 to 11.00

Secondary Metals

Remelt aluminum No. 12	16.50 to 17.00
Brass ingot, 85-5-5-5	14.00 to 14.50

Coke Oven By-Products

Per Gallon at Producer's Plant in Tank Lots

	Spot
Pure benzol	$0.21
90 per cent benzol	0.23
Toluol (nominal)	0.40
Salvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17
Per Pound at Producers' Plants	
Naphthalene flakes	0.05 to 0.06
Naphthalene balls	0.05 to 0.06
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.30

Mercury Is Unchanged

New York, Dec. 11.—Quicksilver is seasonably quiet and unchanged at $122.50 to $125 a flask.

Warehouse

December Lull Envisions Inventories—Small Orders Drop—Larger Individual Orders Noted Elsewhere—New York Sheets Higher

DECEMBER dullness is gripping the warehouse market. In some directions the lack in numbers of small orders, as buyers approach inventory periods is compensated for by larger individual tonnages on the part of purchasers who must finish work by the end of the year and cannot obtain mill deliveries in time. Hence the balance in total tonnage is maintained at November rate.

Boston—Indications point to a slightly firmer price range for most warehouse materials shortly. Orders represent a good volume, taken in small lots. Buyers place repeat orders frequently. Collections are satisfactory.

New York—Black and galvanized sheet prices continue to firm up in the local warehouse market. Black sheets now are 3.90c to 4.00c, and galvanized 4.60c to 4.75c. This tendency follows mill advances. It is believed that as the more cheaply bought material is worked off, the market will firm up to the maximum levels, held now by leading warehouses. Tonnage holds up unusually well for this season of the year. Some aggregates so far are in excess of the November rate.

Buffalo—Approaching holidays already adversely affect warehouse sales. Early December business, however, has been above the averages of recent years. Sheets and small shapes continue good sellers. Prices are unchanged.

Detroit—Slow mill delivery still helps local warehouses, though demand will show a seasonal decline within the next ten days. The movement of products from warehouse is even. Prices are unchanged.

Philadelphia—Current bookings exceed the November average. Jobbers now generally add the full warehouse size extras on sales in Delaware. In this they follow the method of some Delaware jobbers. Prices here continue firm, with quantity differentials in the main observed.

Pittsburgh—Demand has declined slightly but still is seasonably high. Jobbers anticipate a quiet period until Jan. 1, at which time some may advance sheet prices. Wire and nails also may rise. Shading still is noted on concrete bars where mill competition enters.

Cleveland—Numerically, orders are declining, but from a tonnage standpoint the aggregate remains about the same as for November to the same date. Several buyers, unable to await mill deliveries for work that must be out by Dec. 31, are buying 15

(*Concluded on Page* 1531)

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.10c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles	3.30c
New York †††‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	2.50c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.10c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.50c
New York††	2.80c to 3.24c
Philadelphia*	2.80c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.31c
Boston	3.265c to 3.50c
Buffalo	2.75c
Cincinnati	3.15c
Cleveland	2.25c to 3.00c
Detroit	2.30c to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl...	2.65c
Los Angeles lcl.	3.00c
New York	2.85c to 3.25c
Philadelphia	2.85c
Pittsburgh	2.75c to 3.175c
San Francisco cl.	2.00c
San Francisco lcl.	2.25c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.10c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York†††‡	3.25c to 3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	2.90c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.10c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.30c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Phila., 3/16-in.*	2.90c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.45c
Boston, 3/16-in.	3.915c
Buffalo	3.50c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.90c
Portland	3.75c
Philadelphia*†	3.15c
Pittsburgh**	3.00c to 3.10c
San Francisco	3.90c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.54c

NO 24 BLACK SHEETS

Baltimore	3.10c to 4.00c
Boston	4.85c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Cleveland	3.60c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York†††	3.90c to 4.00c
Philadelphia*†	4.00c
Pittsburgh‡	3.55c to 3.80c
Portland	4.90c
San Francisco	4.95c
Seattle	5.00c
St. Louis	4.10c
St. Paul	3.95c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore	4.10c to 4.75c
Boston	5.60c
Buffalo	4.70c to 4.85c
Chicago	4.65c
Cincinnati	4.75c
Cleveland	4.45c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.30c
Los Angeles	5.30c
New York†††	4.60c to 4.75c
Philadelphia*†	4.75c
Pittsburgh‡	4.40c to 4.55c
Portland	5.50c
San Francisco	5.40c
Seattle	5.50c
St. Louis	4.95c
St. Paul	4.90c
Tulsa	6.50c

BANDS

Baltimore	3.85c
Boston	4.015c to 5.00c
Buffalo	4.05c
Chicago	3.65c
Cincinnati	3.95c
Cleveland	3.65c
Detroit	3.65c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	4.00c
Philadelphia*	3.35c
Pittsburgh	3.60c
Portland	3.75c
San Francisco	4.10c
Seattle	4.00c
St. Paul	3.90c
Tulsa	4.50c to 4.66c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	4.15c
Cincinnati	4.25c
Cleveland	3.65c
Detroit	4.15c
New York‡‡	4.50c
Philadelphia*	3.60c
Pittsburgh	4.50c
Seattle	5.00c
St. Paul	4.40c

COLD FINISHED STEEL

	Rounds, hexagons,	Flats, squares
Baltimore (c)	3.35c	3.85c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.50c	4.00c
Philadelphia*	3.45c	3.95c
Pittsburgh	3.60c	4.10c
Portland (a)	4.75c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.76c	5.26c

(a) Rounds only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pound lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.00c

(b) Net base, straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL

New York duty paid

Hollow drill steel	13.00c
Iron bars, rounds	6.10c
Iron bars, flats and squares	6.50c

*Plus quantity differentials. ‡‡Minus quantity differentials. ††Domestic bars. ‡10 to 24 bundles. **25 or more sheets. *†50 or more bundles. †††Newark-Jersey City 4.00c on black and 4.70c on galvanized the more prevalent figures.

Pacific Coast

Light Buying in Small Lots Marks Situation—Much Work Is in Prospect

SEASONAL factors hold demand to a low mark and most buying is for immediate needs, with no tendency to accumulate stocks. Prices are steady. Activity in planning for future construction promises continuance of good volume of business for some time. Some jobs for water control works help fabricators. A tin plate inquiry from the Standard Oil Co. carries tonnage.

San Francisco, Dec. 8.—(*Via Air Mail*)—With the approach of the holidays and the inventory period, demand for iron and steel products is beginning to fall off. Prices in most lines are holding fairly firm to the established levels, but weakness continues to prevail in out-of-stock prices on reinforcing steel bars in the San Francisco and Los Angeles districts, 1.80c base being general, compared with 2.30c c.i.f. coast ports, on merchant bars.

Pig Iron and Coke

Demand for Foundry pig iron and coke continues to involve unimportant lots. A shipment of English coke, about 4500 tons, has been delivered to melters who placed their orders several months ago. Prices are unchanged.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	24.00 to 25.00

*C.i.f. duty paid.

Bars, Plates and Shapes

Awards of concrete bars this week totaled 2369 tons, the largest total in over five weeks. To date this year 82,849 tons have been booked, compared with 58,282 tons for the corresponding period in 1927. The Pacific Coast Steel Co. secured 600 tons for the Bernal Cut project at San Francisco, and 248 tons for the south spillway of the East Bay municipal utility district at Oakland. Gunn, Carle & Co. took 131 tons for the Bekins warehouse and 100 tons for Magnin's store in San Francisco. Jobbers are figuring on 355 tons for a rest home for the Christian Science church in San Francisco and on 310 tons for a hotel at Fairfax, Calif.

Bids open next week on 125 tons of plates for an 18-inch pipe line at Vancouver, B. C. The largest new inquiry calls for 250 tons of plates for a steel tank for San Rafael, Calif., bids on which open Dec. 18. Plate prices continue firm at 2.25c c.i.f. coast ports.

Structural shape awards placed during the past week totaled less than 1000 tons and brought the aggregate for the year to 140,085 tons, compared with 128,821 tons for the corresponding period a year ago. Baker Iron Works took 190 tons for an office building at Santa Monica, Calif., and the Hudson-Pacific Co. obtained 150 tons for a church in San Francisco. Plain domestic shapes are firm at 2.35c c.i.f. coast ports.

Other Finished Material

Pending business in cast iron pipe totals less than 1400 tons. New inquiries include 323 tons of 4 to 8-inch pipe for Burbank, Calif. Bids have been opened on 548 tons for the improvement of Arlington street, Los Angeles. The Hancock Oil Co., Los Angeles, has decided to use second hand pipe on its installation under the Long Beach channel. The original inquiry involved 785 tons.

The Standard Oil Co. has inquired for the equivalent of 45,000 boxes of 14¼ x 18½-inch tin plate and 13,000 boxes of 10 x 20-inch tin plate, totaling 4000 tons.

Seattle Trade Quiet

Seattle, Dec. 5.—Business conditions are rather better than normal for this season in the Pacific Northwest. While little new business is expected before the middle of January, an exceptional amount of construction and building is contemplated in this district.

Pig Iron and Coke

Conditions are fair in the foundry trade. Buying is limited as plants are generally well stocked. Purchases consist of small lots of Columbia iron although a shipment of Burn, India, iron is enroute. Some plants have contracted for the first six months of 1929 for Columbia iron at $26 and $26.50, according to analysis. Coke is being bought in small lots Victoria at $13.50 and Tyneside at $13.25. Practically no domestic coke is being used by local plants.

Bars, Plates and Shapes

Mill prices are firm and unchanged, bars and shapes at 2.35c and plates at 2.25c. Local steel mills report lack of specifications but there is considerable new business in car lots so that operations are unchanged. The Northwest Steel Rolling Mills, Seattle, this week booked 200 tons of reinforcing tonnage for state highway and miscellaneous work.

Willamette Iron & Steel Works, Portland, Oreg., has the contract for constructing four steel pipes, 60 feet long and 98 inches in diameter, 250 tons of flange steel plate, riveted butt construction, for the Seattle Diablo dam outlet. The same plant has received the contract for two sulphite digesters for an Oregon plant, involving 180 tons. About 375 tons of steel are involved in three roller type dam control gates being built by the Willamette shops for the Leaburg project, Eugene, Oreg.

Finished Materials

Jobbing houses report business better than normal for this tme of year, everything out of stock being in fair demand. Sheets are not active but mill and construction materials are moving in average volume.

Bids have been opened for the Friday Harbor, Wash., water system for 282 tons of cast iron pipe and a steel tank involving 65 tons of steel. Pittsburgh-Des Moines Steel Co. was low bidder for the latter unit at $8965.

Old Materials

Steel and cast iron scrap are firm. Local mills are still quoting $10 and $11, gross, for steel scrap but better prices are being paid for select grades. Japanese buyers are active at Vancouver, B. C., and elsewhere along the coast, paying $12 and up for good material. Cast iron scrap is comparatively scarce, sales being reported at $14.50, net.

Pails, Tubs, Still Up

Washington, Dec. 11.—Galvanized sheet metal ware production in October continued to gain, statistics of the department of commerce show. Following are comparisons by months:

	PAILS, (In dozens)		TUBS,	OTHER WARE
	Production	Shipments	Production	Shipments
Oct.	151,495	141,101	39,006	41,366
10 mos.	1,462,762	1,487,633	367,388	375,570
Nov.	112,690	110,275	35,602	28,578
Dec.	93,273	90,254	22,090	17,013
1927	1,668,725	1,688,162	425,080	421,161
1928				
Jan.	125,536	149,304	32,678	35,689
Feb.	165,757	162,153	28,513	26,334
March	173,592	175,472	50,904	45,205
April	208,544	201,119	31,545	36,452
May	177,170	155,561	39,206	35,140
June	141,448	144,385	48,038	44,833
July	114,343	121,415	61,688	47,856
Aug.	127,797	142,487	37,846	44,377
Sept.	150,845	139,183	55,850	50,606
Oct.	153,813	152,258	56,469	54,596
10 mos.	1,550,910	1,557,309	445,833	423,842

Inland Stack Goes In

Chicago, Dec. 11.—Inland Steel Co. this week is blowing in its fourth steelworks blast furnace, which has been out some weeks for repairs, and active steelworks furnaces now number 24 out of 36. Operations for the Chicago district continue at about 80 per cent of ingot capacity. Several of the bar and hot strip mills are operating close to capacity. Sheet mill operations are 80 to 85 per cent.

In 1927 there was a decrease of 17 per cent in the total quantity of grindstones and pulpstones sold by producers as compared with 1926.

Newton's New Capital to Go Into Plant

Youngstown, O., Dec. 11.—Stockholders of the Newton Steel Co. at their special meeting here yesterday approved a proposal to increase the number of shares of common stock outstanding by splitting the present 100,000 shares of stock two for one making a new total of 200,000 shares and selling 40,000 additional shares of a total additional authorization of 100,000 at not less than $43.75 a share. The additional new money of about $1,750,000 is said to be likely to be devoted largely to modernizing experimental work in the Newton Falls, O., plant. The details of the new equipment, however, have not yet been decided upon definitely by the directors.

Directors also declared the regular dividend on preferred stock, payable Jan. 31. For the third successive quarter this year directors increased the dividend on common stock, for the fourth quarter to $1 a share, payable Dec. 31. The first quarter dividend was 50 cents a share, second quarter 62½ cents and third quarter 75 cents.

President E. F. Clarke said business is good for this season and is expected to be even better in the first quarter. The company will continue at capacity until Christmas week, when it will go down for needed repairs and inventory, to resume after New Year.

Aetna Acquires Rights to New Processes

Youngstown, O., Dec. 11.—Acquirement of the sole American and Canadian rights of the pickling and annealing process for flat rolled products invented by Wilford Hanby, British metallurgist, by the Aetna-Standard Engineering Co., with plants at Warren, O., and Ellwood, Pa., has been made by President M. I. Arms, of the Aetna-Standard company.

This Hanby process, it is claimed, will eliminate black annealing and black pickling, white annealing and white pickling, and replace these operations with one operation in the making of tin plate, strip and sheets. The time of making tin plate, it is declared, will be cut down one-half by the new process. It provides for a liquid bath in which steel may be immersed in bulk or put through the continuous process.

All rights in the process are owned by the Richard Thomas combine of British manufacturers. Five French tin plate makers have acquired licenses under the Hanby patents. In America this will be known as the Aetna-Hanby process.

President Arms is quoted as saying this is the first forward step taken by the flat rolled steel industry in annealing and pickling in many years and has long been sought.

Scrap Institute Forms New Bureaus

Directors of the Institute of Scrap Iron and Steel have authorized creation of four bureaus, traffic, insurance, arbitration and trade relations. The board has authorized the formation of chapters in Cleveland, Detroit, Chicago, St. Louis and Boston before the annual meeting. The following new members of the board of directors were elected: George B. Doane, of Perry, Buxton, Doane Co., Boston; Alex Luria, of Luria Bros., Reading Pa.; N. H. Jacobs, of Buffalo House Wrecking & Salvage Co., Buffalo; John R. Briggs, of Henry Potts & Co., Philadelphia; I. Wilkoff, of the Wilkoff Co., Youngstown, O.; and Morris Speer, of Rotter-Speer Co., Cleveland.

Nonferrous Buying Quiet

(*Concluded from Page* 1528)

late in November for delivery through first quarter. More buying probably remains to be done for next quarter but users appear well covered now. Prime western and high grade are unchanged and firm. Stocks of slab zinc of producers increased in November with production exceeding shipments, according to American Zinc institute. Production during November aggregated 50,260 tons, compared with 50,259 tons in October. Shipments into consuming channels last month amounted to 49,786 tons against 52,106 tons in October. Stocks on hand at the end of November totaled 46,542 tons against 46,068 tons a month preceding.—*Daily Metal Trade.*

Jobbers Fairly Active

(*Concluded from Page* 1529)

to 30 tons at a time from jobbers. This substitutes for the many small orders held back by inventory influence. The latter tonnage is merely dammed up for release after Jan. 1.

St. Louis—Business exceeds expectations. The general manufacturing trade accounts for liberal tonnages of a broad assortment of commodities. Strips and galvanized sheets move well.

Car builders have been good buyers. They are expected to increase their takings. Building materials show less than the usual recession in activity at this season.

Cincinnati—Warehouse shipments have increased slightly due largely to increased prices obtained on finished products and also to a widening demand from hardware retailers. Some orders for builders' supplies are also noted. New business, however, is slowing down quietly.

Pig Iron Market Is Quieter

(*Concluded from Page* 1517)

tional tonnages will be needed. Sales of foundry iron in the past week totaled approximately 1500 tons. The leading local producer reports shipments and sales in November the largest of any month in its history. Its shipments so far in December average higher than in November. This producer expects to blow in its idle stack Dec. 11. Southern producers have advanced their price to a basis of $21.42 delivered in St. Louis. The chief local producer still quotes $20 and $20.50, furnace, for foundry and malleable, respectively.

Chicago, Dec. 11.—With all melters covered for the next 90 days pig iron sales are confined to small spot orders or supplemental contract purchases. Shipments are holding up approximately to the November rate, but a recession is expected soon. Occasional hold-up orders are received as some foundries are taking inventory. The arrival of two final cargoes of iron from lower lake furnaces completes the movement of about 25,000 tons for the season, as against 35,000 tons of boat iron in 1927. One lot of southern iron was sold here at $20.50, Chicago. Competition is active in western Michigan. Several malleable melters in this territory have been forced to add to earlier purchases due to increases in their orders. Chicago prices continue firm at $20, base.

Birmingham, Ala., Dec. 11.—Sales of pig iron are fairly active, mainly in small lots for delivery during the next two weeks. Larger melters have placed orders for delivery during first quarter. The lead of the Sloss-Sheffield Steel & Iron Co. in advancing the base price of $17 has not been followed actively by other producers. Surplus stocks of foundry iron are being reduced.

Toronto, Ont., Dec. 11.—Pig iron producers have opened books for first quarter and several large contracts have been received. Spot sales also are showing steady improvement. Some quotations have gone out for first quarter at $24.10, Toronto, but No. 1 foundry iron can be purchased at $23.60, and some sales have been made at the old price of $23.10, Toronto. Price shading is confined to domestic iron.

Philadelphia, Dec. 11.—About 5000 tons of foundry iron was sold in this district in the past week, mainly for first quarter. Prices are unchanged at $20.50, base, eastern Pennsylvania, for December and $21, base, for first quarter. The Salem Brass & Iron Co. which inquired for 2000 tons, has closed for a portion. The Lobdell Car Wheel Co. bought 300 tons.

An investigation has been undertaken by the bureau of standards, Washington, in co-operation with the American Electric Railway association for the purpose of determining the relative efficiencies of different types of reduction gearing under all conditions of load, speed and lubrication.

Urges Iron Ore Mining Industry Be Freed From Tax Inequalities

REMOVAL of tax in equalities in the iron ore mining industry by state legislatures and governmental agencies was urged by S. L. Mather, Cleveland, vice president of the Cleveland-Cliffs Iron Co. at the convention of the American Mining congress at Washington last week. Mr. Mather discussed particularly conditions in the Lake Superior district in Minnesota, Michigan and Wisconsin. Because of keen competition of mining and selling of iron ore there has been improvement in underground operations tending toward economical production. In spite of increases in cost of operation of iron mines, Mr. Mather said the average selling price of iron ore at the mine was only 10 per cent higher than 20 years ago.

"The most marked increase has been in taxes, both state and federal," said Mr. Mather, who declared that iron mine companies are unanimous that they are taxed more than their just proportion. For a group of mines, the tax per ton doubled from 1907 to 1917 and again doubled in the next ten year period, being four times that 20 years ago.

"Mining companies are ready and willing to pay their fair proportion of taxes," said Mr. Mather. "In the past there has been too much individual action and too little frank discussion of this whole problem. Twenty years ago each concern was content to handle it in its own way. Now the problem has become so complex that co-operation is essential to secure a fair solution. The problem is such a complicated one that it cannot be solved by immediate action. There appears to be no short cut and no all-healing balm which will cure all troubles, but with a sincere desire on the part of the mining industry as a whole, it would seem as though these problems can be solved. We strongly feel that the legislators cannot have realized that the present tax laws were working such a hardship or they would have been modified to more nearly equalize the burden of taxation."

Robert E. Tally, general manager of the United Verde Copper Co., was elected president of the congress for the coming year. Other officers elected include: William H. Lindsey, president of the Napier Iron Works, first vice president; Jesse F. McDonald, president of the Downtown Mining Corp., second vice president; S. L. Mather, president of the Cleveland-Cliffs Iron Co., third vice president; J. F. Callbreath, Washington, secretary.

The executive committee will consist of Mr. Tally, J. B. Warriner, vice president of the Lehigh Coal & Navigation Co. and Otis Mouser, of the Stonega Coke & Coal Co. New directors include: James T. Skelly, Hercules Powder Co., and Messrs. Tally and Mather. Mr. Lindsey was elected a director for two years beginning in 1929.

At the closing session the congress adopted the following resolution on tariff:

"Whereas, the protective tariff policy is an essential part of the economic system of this country, and,

"Whereas, the mineral industries cannot successfully operate without adequate tariff protection; Be it therefore,

"Resolved, That the American Mining congress reiterates its policy of protection for the mineral industries sufficient to enable the greatest development of these industries."

Locomotives Decline

Washington, Dec. 11.—Locomotive shipments in November declined slightly from October, according to department of commerce statistics. Monthly comparisons follow:

Year and Month	Shipments Domestic Total	Steam	Electric	Unfilled orders Domestic Total	Steam	Electric
1927						
Nov.	52	31	7	145	74	42
(11 mos.)	1.002	685	135	.....	.....	.....
Dec.	72	41	13	232	178	39
1927	1,074	726	148	.....	.....	.....
1928						
Jan.	47	22	23	222	161	38
Feb.	59	43	11	204	146	40
March	70	44	15	178	123	37
April	46	38	6	188	129	41
May	41	29	10	220	138	39
June	51	39	11	201	109	37
July	46	19	5	198	98	59
Aug.	34	23	4	204	135	26
Sept.	41	28	2	178	118	27
Nov.	35	20	1	152	104	31
(11 mos.)	506	331	88	.....	.....	.....

Will Make New Metal

American sales rights for a process of making the new pearlite metal have been obtained by the Eastern Steel Castings Co., Newark, N. J. W. D. Sargent, president of the company, returned recently from Germany, having negotiated the rights from Heinrich Lanz of Mannheim, A. Borsign of Berlin, Thyssem of Gelsenkirchen, and the Esslingen Machine Works. The Eastern company, in addition to producing electric steel castings, plans to begin the manufacture of pearlite iron early in 1929. In the past three years the company has carried on a rehabilitation program, including the installation of much new equipment.

Buffalo Scrap Dealers Form Chapter

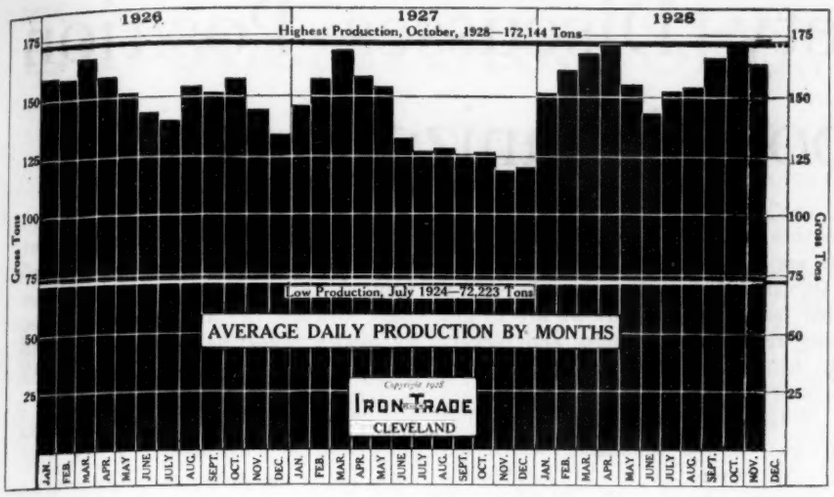
Charles Bock, of M. Bock & Son, Buffalo, was elected president, and Joseph Maher of the Pennsylvania Wood & Iron Co., Buffalo, was elected chairman of the executive committee of the seventh chapter of the Institute of Scrap Iron and Steel, which was organized at Buffalo. Sixty dealers from Buffalo, Elmira, Niagara Falls, Rochester, Syracuse, Utica, N. Y., Erie, Pa., and other cities in the Buffalo territory representing thirty-one firms, were present.

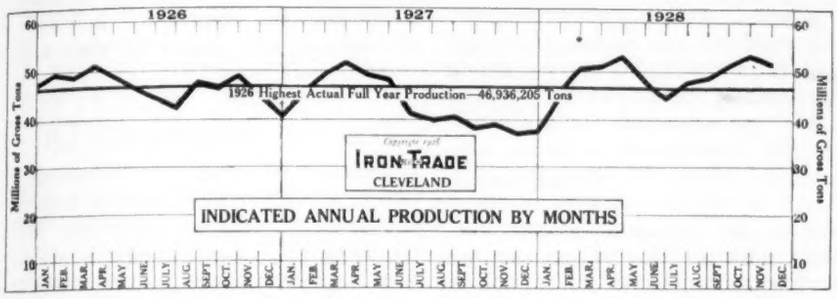
The other officers include Solomon Morrison, of Morrison & Risman Co., Buffalo, first vice president; Louis Hurwitz, of Hurwitz Bros., Iron & Metal Co., Syracuse, second vice president; Ben Rosenthal, Rochester Smelting & Refining Co., Rochester, third vice president; John E. Farrell, Buffalo, secretary; Harry Roblin, of Buffalo Housewrecking & Salvage Co., treasurer. The executive committee consists of I. S. Snyder, of the S. Snyder Corp., Rochester, N. Y.; Saul Frankel of Rochester Iron & Metal Co., Rochester; Nat Jacobs, of Buffalo Housewrecking & Salvage Co., Buffalo; Max Pressler, of Joseph Schonthal Co., Buffalo; Harry Zacks, of Erie Iron & Steel Co., Erie, Pa.; David Falk, of Falk Iron & Metal Co., Rochester; and Philip Roth, of B. & R. Iron & Metal Co., Syracuse.

To Reduce Vanadium Ore

Reduction of local vanadium ore is contemplated by the Vanadium Metals Corp., Everett, Wash., recently incorporated for $150,000. According to Alfred Stalberg, Everett chemist who is president of the company, the vanadium trioxide found in local ores will be smelted with finely divided particles of iron. The iron, having an affinity for oxygen, unites and leaves a metallic vanadium claimed to be unusually free from impurities. A plant is to be erected in Everett an electric furnace installation made.

Tests made by the bureau of standards. Washington, in co-operation with the American Society of Mechanical Engineers have been completed on a series of 84 journal bearings, comprising 21 variations of length or clearance dimensions in order to determine the effect of the length of the bearing and the closeness of the fit on the friction loss.





November Ingot Rate Is Down

AFTER four consecutive months of gain ending in the new high record in October, production of open-hearth and bessemer steel ingots turned downward in November. In spite of the recession, the rate was the highest for any November in history. It is customary for production to taper off at the close of the year, thus no concern should exist. According to statistics compiled by the American Iron and Steel institute, the November output was 4,259,380 gross tons, which compared with the 4,647,891-ton total of the preceding month was a loss of 388,511 tons. Part of the reduction is explained by the fact that November had only 26 working days, against 27 in October.

The daily rate of production was 163,822 tons, while in the month before the record rate was 172,144 tons per day. The loss was 8322 tons per day, or 4.83 per cent.

On the basis of an output of 163,822 tons per day in November and 311 working days in the year, the indicated annual output was 51,000,000 gross tons. The corresponding rate for October was 53,500,000 gross tons. Operations in November represented 86.9 per cent against 91.32 per cent in October and 88.01 per cent in September.

For the 11 months ended November, total production has aggregated 45,837,791 tons, while in the corresponding period of 1927, the total was only 40,222,259 tons. In the full year 1926, the record production of 46,597,475 tons was produced, thus the 11-month figure for 1928 is only 757,684 tons short of this. With a production of approximately 3,900,000 tons anticipated for December, the current year will set a record surpassing the 1926 figure by about 3,150,000 tons.

The daily rate in 1928 has averaged 160,272 tons, against 141,131 tons last year. Operations in 1928 have averaged 85.02 per cent and 76.69 per cent for 1927.

Steel Ingot Production—1927-1928

94.68 Per Cent of Industry Reporting

Gross Tons

1927	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	Number of working days	Approximate daily output all companies	Per cent of operation
Jan.	3,042,133	545,596	3,587,729	3,789,874	26	145,764	79.21
Feb.	3,043,492	565,226	3,608,718	3,812,046	24	158,835	86.31
March	3,702,660	590,709	4,293,369	4,535,272	27	167,973	91.28
April	3,341,750	565,440	3,907,190	4,127,335	26	158,744	86.26
May	3,273,593	557,785	3,831,378	4,047,251	26	155,663	84.59
June	2,823,107	486,053	3,309,160	3,495,609	26	134,446	73.06
July	2,596,349	436,883	3,033,232	3,204,135	25	128,165	69.65
Aug.	2,806,347	505,596	3,311,943	3,498,549	27	129,576	70.41
Sept.	2,622,977	471,548	3,094,525	3,268,881	26	125,726	68.32
Oct.	2,643,562	495,845	3,139,407	3,316,292	26	127,550	69.31
Nov.	2,478,627	481,599	2,960,226	3,127,015	26	120,270	65.36
Total 11 mos.	32,374,597	5,702,280	38,076,877	40,222,259	285	141,131	76.69
Dec.	2,557,955	448,154	3,006,109	3,175,484	26	122,134	66.37
Total	34,932,552	6,150,434	41,082,986	43,397,743	311	139,543	75.83
1928							
Jan.	3,280,247	498,746	3,778,993	3,991,332	26	153,513	81.43
Feb.	3,308,728	521,366	3,830,094	4,045,304	25	161,812	85.84
March	3,700,411	567,309	4,267,720	4,507,520	27	166,945	88.56
April	3,509,637	564,039	4,073,676	4,302,573	25	172,103	91.29
May	3,397,631	581,949	3,979,580	4,203,190	27	155,674	82.58
June	3,016,487	527,351	3,543,838	3,742,964	26	143,960	76.37
July	3,075,247	533,550	3,608,797	3,811,573	25	152,463	80.88
Aug.	3,386,750	569,436	3,956,186	4,178,481	27	154,759	82.09
Sept.	3,381,917	545,015	3,926,932	4,147,583	25	165,903	88.01
Oct.	3,802,396	598,227	4,400,623	4,647,891	27	172,144	91.32
Nov.	3,441,985	590,796	4,032,781	4,259,380	26	163,822	86.90
Total 11 mos.	37,301,436	6,097,784	43,399,220	45,837,791	286	160,272	85.02

Figures exclude crucible and electric ingots. Operation percentages for 1927 are based on an annual open-hearth and bessemer steel ingot capacity of 57,230,350 tons, as of Dec. 31, 1926; for 1928, on 58,627,910 gross tons as of Dec. 31, 1927.

Steel Suit Dismissed

Warren, O., Dec. 11.—One of two lawsuits brought against the Trumbull Steel Co. and directors by minority stockholders has been dismissed in common pleas court. It was an injunction action opposing the merger of Trumbull with the Republic Iron & Steel Co.

The other suit, filed by J. Fred Waldeck, owner of 175 shares of common stock, attacks the directors for depositing a sum of money with Otis & Co., claiming the establishment of a speculative pool by certain directors and others.

The Republic Iron & Steel Co. has released all the defendant directors from liability and has taken over the defense of this action.

Squire Whipple of Albany, N. Y., patented an iron truss bridge in 1841.

Taylor Society Discusses Position of Labor Organizations

WHILE budgeting continues important in the program of the Taylor society, the scope of its activities has broadened and many new phases were introduced at the annual meeting at Rumford hall, New York, Dec. 5-7.

Manufacturers today are concentrating their attention on problems of marketing, according to Ralph H. Dick, president, Barrington Associates Inc., New York. Nevertheless, he said, the results of technical research, the growth of consolidations and mergers and the development of highly specialized equipment present problems of increasing significance to management.

The address of the retiring president, Morris L. Cooke, consulting engineer, Philadelphia, was on the subject of workers' organizations. The interest of society, including that of the workers, suggests some measure of collective bargaining in industry to the end that the weaker side may be represented in negotiations as to hours, wages, and status of working conditions, according to Mr. Cooke. Collective bargaining implies the organization of the workers on a basis extensive enough to make this bargaining power effective. Competition is gradually giving way to co-operation. Therefore if the group cohesion of the workers is to be continued it will be through giving to labor organizations that functional status in the industrial process which is now denied.

Should Consider Trade Unions

Mr. Cooke feels that if labor organizations are in fact desirable social agencies and essential to the orderly conduct of industry they logicially come within the field of management and industrial engineering. Considering this, he continued, it is hard to see why we have heretofore all but ignored one of the most vital factors in the whole industrial domain, the organizations of the workers. The speaker said that after giving the question much study he now felt that management engineers should include in their province the consideration of trade unions.

These trade unions, he declared, cannot be expected to find the way to co-operation alone, neither can they make the transition from an isolated position to a co-operative one without assistance.

Quoting from the remarks of a labor leader he said, "If we are to get away from the bitterness and bickering which constitute the worst outcome of the industrial revolution, there must be more frankness in our discussions. If the confidence which begets frankness is to be established some status for organized labor must be afforded. As professional management engineers, the speaker suggested, members of the Taylor society should help organize such a status. "Should we not," he continued, "include in our field the development of those techniques by which the various organizations of workers can be given a place in the industrial process consistent with all that science is contributing to industry?"

Workers Must Organize

The history of the race indicates that under the institution of private property the workers, the weaker party, must organize to protect both society and themselves. Each year new problems arise which continue very definitely the necessity for some organization of the workers. Mr. Cooke thinks that we may be getting beyond the point in which the battle in industry is for opportunity to eat and be warm. Mr. Hoover may be only abreast of the times in pleading the cause of the full garage rather than of the full dinner pail.

The speaker analyzed in considerable detail the formation of company unions and other groups among workers, and concluded his talk with three major tenets: 1. We must preserve to the worker group in industry a fair bargaining position so that they can safeguard themselves in the proper distribution of the rewards of productive enterprise. 2. There must be a general acceptance of the validity of the scientific method of action originating at the top. This carries with it the implication that decisions are to be made by those who find the facts. 3. The organization of the workers must be sufficiently broad in scope geographically and industrially to enable the workers to have access to the best that is known of theory and practice of subjects under their scrutiny.

Basic principles of cost accounting were presented by John H. Williams industrial engineer, New York. Geoffrey C. Brown, consulting engineer East Orange, N. J., discussed means by which scientific management can promote a new functional status for workers. E. Haydon Hull presented a paper on "Technique in Selection for Subexecutive Positions." H. S. Person, managing director of the society, gave suggestions concerning a more comprehensive approach to such problems as the shorter workday and shorter work week.

Tractor Shipments Off

Washington, Dec. 11.—November shipments of electric industrial trucks and tractors dropped somewhat, department of commerce figures show. The November figure is only slightly under the record month for 1928. Monthly comparisons follow:

	Domestic		
1927	Tractors	All other Types	Exports
Nov.	15	64	19
Total, 11 mos.	127	917	119
Dec.	8	77	11
1927 Total	135	994	130
1928			
January	5	98	9
February	15	86	18
March	18	95	16
April	9	121	6
May	8	93	13
June	6	96	14
July	5	87	15
August	5	85	6
September	11	102	5
October	5	109	20
November	8	117	6
Total 11 mos.	95	1,089	128

Enameled Ware Rises

Washington, Dec. 11.—Total shipments of enameled sheet metal ware in October advanced confortably, according to the department of commerce. Monthly comparisons follow:

	In dozens			
1927	Total	White	Gray	Colored
October	322,081	169,351	126,344	26,386
10 mos.	3,522,535	1,756,163	1,371,219	195,153
November	287,115	153,283	106,104	27,728
December	307,280	161,922	119,885	25,473
Tot., 1927	3,916,930	2,071,368	1,597,208	248,354
1928				
January	319,871	155,172	132,136	32,563
February	372,848	179,794	131,485	61,569
March	442,689	200,010	152,895	89,784
April	351,034	143,470	123,808	83,756
May	348,661	158,458	116,541	73,662
June	299,078	141,486	95,959	61,633
July	277,684	125,653	108,584	43,447
August	358,811	164,580	134,191	60,040
September	352,484	172,127	130,337	50,020
October	417,387	190,424	166,078	60,885
10 mos.	3,540,547	1,631,174	1,292,014	617,359

Oilstones are produced in the United States from novaculite quarried in Arkansas.

European Steel Shows Contrast

French and Belgian Producers Working at Capacity—Ruhr Blast Furnaces at 30 Per Cent and Rolling Mills at 70 Per Cent—British Markets Seasonally Dull—Russian Order for 12,000 Tons of Sheets and Bars Reported Placed in Poland

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, Dec 11.—(*By Radio*)—British iron and steel markets register seasonal dullness, although the outlook is brighter. Shipbuilding orders are stimulating inquiries for plates and sections. The report of the Indian commissioner opens a hopeful prospect for British steel due to development of Indian utilities. Three blast furnaces in Scotland have been blown out, as demand for pig iron is low and prices unprofitable. Belgian billets are being offered in Birmingham at £5 18s ($28.60) against the domestic price of £6 5s ($30.31), but sales are light.

A report from Berlin states Ruhr blast furnaces are operating at 30 per cent and rolling mills at 70 per cent, since settlement of the lockout. Prices are unchanged. Polish steelworks are reported to have obtained a Russian order for 8000 tons of steel bars and 4000 tons of sheets. French and Belgian steelworks are operating at capacity, but new business is diminishing.

British Steel Market Has Some Bright Spots

BIRMINGHAM, Eng. Nov. 30.—The trade is in a gloomy mood. A glance at the reports from the northeast coast, however, is more reassuring. Dorman Long & Co. have started a furnace at the Acklam Ironworks at Middlesbrough to make steelworks iron, a step which would not have been taken unless demand warranted it.

The pig iron market on the north east coast is certainly improving and furnaces in blast now number 31. The prewar total was something like 70 but undue importance need not be attached to this owing to the considerably larger output of modern equipment. The hematite position is gradually improving for the gradual

Sterling $4.85

disappearance of stocks led to a relighting of a furnace as already reported, a week ago, and sellers are finding themseuves strong enough to charge more for their iron.

For a long time the basis for mixed numbers has been £3 10s ($16.97) but now sales for delivery two or three months ahead have been arranged at £3 11s ($17.21). Inquiries on hand emanate from home and Continental consumers. Favorable influences in the pig iron market are spreading to the manufactured iron and steel trade of Teesside, some works being able to make good output, and inquiry from home and export is well maintained. Teesside shipbuilding material has been sold to the Continent within the past few days, while specifications for ship plates are being issued more freely from the shipbuilders.

Reports from all centers include a reference to the effect of the German lockout on the English market, and it seems quite probable that its significance is being much exaggerated. One of the largest Birmingham merchants, accustomed to handling foreign and English billets, finds it difficult to arrange sales. This concern still has English billets to offer at £6 5s ($30.31) per ton, but cannot

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 10	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3, Silicon 2.50-3.00	$16.01	3 6 0*	$15.28	3 3 0	$15.28	3 3 0	$15.76	3 5 0
Basic	15.76	3 5 0	15.28	3 3 0	15.28	3 3 0	15.28	3 3 0
Basic-bessemer	16.98	3 10 0†	14.79	3 1 0	14.79	3 1 0	14.55	3 0 0
Hematite, Phosphorus 0.02-0.05	17.22	3 11 0	22.09	575*	.....	.....	16.98	3 10 0
SEMIFINISHED STEEL								
Billets	$30.31	6 5 0	$24.49	5 1 0	$24.49	5 1 0	$24.25	5 0 0
Wire rods	41.83	8 12 6	29.71	6 2 6	29.71	6 2 6	29.71	6 2 6
FINISHED STEEL								
Standard rails	$37.59	7 15 0	$31.53	6 10 0	$31.53	6 10 0	$31.53	6 10 0
Merchant bars	1.68c	7 15 0	1.34c	6 1 6	1.34c	6 1 6	1.32c	6 0 0
Structural shapes	1.60c	7 7 6	1.10c	5 1 0	1.10c	5 1 0	1.12c	5 2 0
Plates, ship, bridge and tank	1.76c	8 2 6	1.37c	6 6 6	1.37c	6 6 6	1.41c	6 8 0
Sheets, black, 24 gage	2.17c	10 0 0	2.21c	10 3 9	2.21c	10 3 9	2.48c	11 5 0
Sheets, galvanized, 24 gage, corrugated	2.93c	13 10 0	3.01c	13 13 9	3.01c	13 13 9	3.41c	15 10 0
Bands and strips	2.17c	10 0 0	1.38c	6 5 0	1.38c	6 5 0	1.49c	6 15 0
Plain wire, base	2.12c	9 15 0	1.71c	7 15 0	1.71c	7 15 0	1.71c	7 15 0
Galvanized wire, base	2.93c	13 10 0	2.15c	9 15 0	2.15c	9 15 0	2.15c	9 15 0
Wire nails, base	2.39c	11 0 0	1.79c	8 2 6	1.79c	8 2 6	1.76c	8 0 0
Tin plate, base box 108 pounds	$ 4.37	0 18 0	.....	.....	.....	.....	$ 6.79	1 8 0

*Francs

Domestic Prices at Works or Furnace—Last Reported			Francs		Francs		Marks	
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$16.01	3 6 0	$17.60	450(2)	$16.54	595	$18.59	78
Basic pig iron	15.76	3 5 0	18.96	485(1)	16.54	595	20.97	88
Furnace coke	3.15	0 13 0	5.87	150	5.14	185	5.12	21.50
Billets	30.92	6 7 6	23.07	590	25.72	925	28.83	121
Standard rails	1.79c	8 5 0	1.46c	810	1.63c	1,250	1.51c	140
Merchant bars	1.68c	7 15 0	1.33c	740	1.42c	1,095	1.52c	141
Shapes	1.71c	7 17 6	1.22c	675	1.22c	940	1.49c	138
Plates, ship, bridge and tank	1.87c	8 12 6	1.54c	855	1.47c	1,130	1.71c	158
Sheets, black, 24 gage	2.28c	10 10 0	2.92c	1,620	2.34c	1,800	2.43c	225
Sheets, galvanized 24 gage, corrugated	2.96c	13 12 6	3.69c	2,050	3.87c	2,975	3.78c	350
Plain wire	2.12c	9 15 0	1.94c	1,075	1.30c	1,000	2.48c	230
Bands and Strips	2.17c	10 0 0	1.53c	850	1.72c	1,325	1.77c	164

*Middlesbrough; †Scotch foundry iron; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 13s 0d ($3.16) f. o. b. Ferromanganese £21 13s 0d ($105.00) delivered Atlantic seaboard, duty-paid. German ferromanganese £15 0s 0d ($72.90) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

find buyers even at this price. Yet works are quoting £6 7s 6d ($30.91). Similarly in steel bars. Firms who have contracts will not take delivery of material, an indication that the nut and bolt trade is quiet.

The Barrow district is sharing the improvement enjoyed by the northeast coast, although there is keen competition between the districts. Many consumers have covered their needs until the end of December, and so far as home trade is concerned matters are not likely to improve much until the end of the year. The average selling price of hematite for the last two months proves that a good deal of material was sold cheaply to reduce stocks. But the better conditions of the last week or two ahve strengthened makers' hands and prices are now quite firm.

The constructional side is not making great demand upon steel mills for all the orders now being booked are moderate.

In the west of Scotland most works producing steel are short of orders for shipbuilding material. The rerolling trades are turning out large quantities but the pig iron position continues poor and a furnace has been blown out by William Baird & Co. Ltd. at the Lugar works. Th is reduces the number of furnaces now producing pig iron in the west of Scotland to 25.

The galvanized sheet trade is having a good run. Makers have now returned to the basis of £13 10s ($65.46) and works in South Wales and the Midlands are booking orders up to £13 15s ($66.67). The work in hand is su....cient to insure activity to the end of the year and some substantial orders have been taken for January delivery.

Tin plate continues on the basis of 18s ($4.37), but if the rise in tin goes on the question of an official advance for tin plate will be imperative. The trade is comparatively quiet as far as new booking is concerned, but makers really have little to grumble about for order books are said to indicate a substantial tonnage for delivery next year. The export markets are showing more interest particularly from the Continent and South America.

British Export Prices

Birmingham, Eng., Nov. 30.—(*European Staff Service*)—The British board of trade return for October shows a total export of iron and steel products, including scrap of 406,866 tons, compared with 311,069 tons in September and 406,183 in October last year. Imports, including scrap, totaled 263,264 tons, compared with 188,996 in September and 338,994 in October last year.

Many increases are registered in exports, foundry iron totaling 19,293 tons, compared with 17,684 and acid quality 16,457 against 11,822. Bars, rods and angles, etc., rose by about 5000 tons, while plates and sheets under ⅛-inch thick totaled 30,371 against 10,146. Galvanized sheets and tin plate both show expansion of about 20,000 tons and wrought tubes increased by nearly 4000 tons. On the other hand railway rails fell from 28,447 tons in September to 23,105 in October.

A sharp upward tendency is noticed in imports, especially in semifinished and finished steel. Pig iron has been steadily reducing for the last few months and the downward movement continues. But in steel blooms, billets, etc., the total rose from 36,618 tons in September to 57,618 tons in October. Steel bars, rods, etc., rose from 31,278 to 54,478 tons. Steel girders increased by about 3000 tons, plates and sheets by 5000, and wrought tubes, pipes and fittings rose from 4599 to 7515 tons.

German Output Larger

Berlin, Nov. 26.—(*European Staff Service*)—Output of pig iron in Germany in October was greater than in September and was composed of 651,-28 tons of basic bessemer, 187,959 tons of ferroalloys, 89,071 tons of hematite, 84,326 tons of foundry, 1671 tons of direct castings, and 1610 tons of gray forge.

Output of steel ingots and castings in Germany in October was also over that of September. It was composed of 1,283,511 tons of ingots and 22,827 tons of castings. Ingot production included 660,328 tons of basic openhearth, 596,090 tons of basic bessemer, 12,948 tons of acid open-hearth, 10,-359 tons of crucible and electric steel, and 3786 tons of ingot iron.

The following table gives comparisons:

Mon. ave.	Furnaces on 31st	Pig iron	Steel ingots and castings	Finished steel
*1913	.....	909,640	993,640	970.240
1925	†83	848,060	1,016,210	853,840
1926	†109	803,625	1,028,470	856,340
1927	†116	1,031,875	1,358,780	1,069,930
1928				
Jan.	116	1,180,239	1,469,455	.....
Feb.	115	1,122,384	1,322,695	1,040,875
Mar.	113	1,170,476	1,421,524	1,145,070
April	107	1,045,468	1,161,405	917,673
May	104	1,044,046	1,247,781	986,459
June	103	1,021,350	1,294,583	1,067,646
July	100	1,034,694	1,311,134	1,026,333
Aug.	99	1,030,837	1,329,345	1,061,799
Sept.	99	985,413	1,189,521	940,797
Oct.	99	1,015,895	1,306,338	1,031,891

*In present boundaries.
†On last day of year.

Belgian Imports Grow

Brussels, Nov. 24.—(*European Staff Service*)—Exports of steel products from Belgium and Luxemburg in August were below those of July, and of pig iron were above those of July. Imports of pig iron into Belgium and Luxemburg in August were 45,589 metric tons, the highest on record. Imports of steel in August exceeded those of July. The following table gives import and export figures:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron	Steel	Pig iron	Steel
1925	27,095	15,860	8,060	242,325
1926	27,505	27,265	13,105	304,075
1927	31,760	27,715	11,350	387,415
1928				
Jan.	37,625	34,357	6,793	289,854
Feb.	40,293	37,481	7,952	401,502
March	43,612	31,294	11,971	458,377
April	36,769	29,203	9,583	325,728
May	36,506	31,971	15,317	338,052
June	44,314	33,793	7,484	382,700
July	42,305	35,409	7,367	344,977
August	45,589	39,329	7,716	294,781

Luxemburg Makes Record

Brussels, Nov. 22.—(*European Staff Service*)—The output of steel ingots and castings in Luxemburg during October reached the highest mark to date, and included 225,116 tons of basic bessemer, 3179 tons of open-hearth and 678 tons of electric steel.

October output of pig iron included 232,819 tons of basic bessemer, 2945 tons of foundry and 665 tons of forge pig iron. The following table gives comparisons:

Mon. ave.	Pig iron	Steel ingots and castings
1913	212,320	111,355
1925	196,940	173,855
1926	209,295	186,980
1927	226,115	205,850
1928		
Jan.	229,602	212,939
Feb.	220,114	205,053
March	240,234	220,309
April	226,983	202,586
May	233,806	214,756
June	230,484	214,925
July	224,807	207,687
August	233,521	224,182
Sept.	231,372	209,163
Oct.	236,429	228,975

Refinance British Firm

London, Nov. 24.—(*European Staff Service*)—Recommendations for the financial reorganization of another large British shipbuilding and engineering firm, William Beardmore & Co. Ltd., Glasgow, have been issued by the advisory committee appointed in March, 1927, to formulate a plan for reorganization of the firm. The recommendations are of a drastic nature, as it is proposed to reduce the capital by nearly £3,000,000 ($15,-000,000). The advisory committee was composed of F. A. Szarvasy, chairman of the British and Colonial Corp., as chairman; Sir Gilbert Garnsey, of Price Waterhouse & Co., accountants; W. W. Paine, a director of Lloyd's Bank; and P. E. Marmion, joint managing director of the Burma Corp.

British Export Prices

London, Nov. 24.—(*European Staff Service*)—Board of trade returns for October, 1928, give the average British export prices per gross ton for certain iron and steel products. These prices are compiled from actual contracts which were made several months ago, and this accounts for the difference between these quotations and the base prices regularly quoted in our columns.

October, 1928

	£	s	d	$
Foundry pig iron	3	17	9	18.81
Beams	8	3	1	39.54
Rails	9	19	1	48.23
Plates	10	13	6	51.74
Black sheets under ⅛-inch thick	12	7	2	59.92
Galvanized sheets	15	17	6	76.95
Tinplates	19	11	0	94.79

Tariff Refund Extended

Washington, Dec. 11.—A bill extending the duty refund on special machinery not manufactured domestically in Czechoslovkia, until Dec. 31, 1929, has just been passed by the Czechoslovak parliament, according to a cablegram to the department of commerce from Acting Commercial Attache K. L. Rankin at Prague.

Expenditures for metallurgical research by the bureau of standards, Washington, for the fiscal year ended June 30, 1928, total $48,140.

Industrial Men in the Day's News

Charles N. Fitts, New President, American Institute of Steel Construction

IN 30 years he has traversed the long, hard road from errand boy in a machine shop to the treasurership of that shop's succeeding company, the New England Structural Co.

BORN in Virginia, he early removed to Boston, where because of lack of funds, he exercised but one year of the scholarship he had won in the Massachusetts Institute of Technology.

SEVERAL years ago he expended time and energy in helping organize the American Institute of Steel Construction, of which he has been a director ever since and now is its head.

HAD Charles N. Fitts been asked 30 or more years ago to cite the difference between an I-beam and an eye bolt his reply would scarcely have been intelligent. Into that period of time, however, he has crammed so much activity and study in the field of steel construction that he now is considered more or less of an authority on structural steel not alone in New England but in other sections of the country as well. It is entirely fitting, therefore, that he should be selected for the honor of election as president of the American Institute of Steel Construction, as recorded in IRON TRADE REVIEW of Nov. 22. It was Mr. Fitts who six or seven years ago accomplished so much constructive work in connection with the organization of the institute, and since he has been on its board of directors.

Better practice and better engineering in the structural steel industry have received his constant, consistent advocacy and he has been one of the most active men in the country in having building codes adopted, incorporating the change in unit stress from 16,000 to 18,000 pounds per square inch. This change has been made in practically all leading cities and has meant an annual saving of many millions of dollars.

Mr. Fitts, who is treasurer in charge of sales and contract work of the New England Structural Co., Chauncy street, Boston, was like a square peg in a round hole for many years. In 1895, finding himself without funds and without a job, he seized the first chance of employment that presented itself. He was employed as errand boy by the Norton Iron Co., Everett, Mass. Steel fabricating had just started and the Norton company, engaged in ornamental iron work, discontinued its line of door checks and turned to steel and iron for the building trades. Mr. Fitts, with rather indefinite duties, was turned loose in the shop, where he made most of his opportunity to study the various operations and the general scope of the company's business. Gradually he became acquainted with the "feel" and character of steel and decided to devote his energy to and make his life purpose, the use of steel in building construction. In time he became chief estimator and after a year or two as salesman he was placed in charge of the contracting department.

In 1898 the name of the company, owned by O. W. Norcross, was changed to the New England Structural Co. Irregular earnings, followed by a fire in 1904, proved disastrous and Mr. Norcross failed. Assets were purchased by W. B. Douglas, C. D. Fisher and Mr. Fitts and the latter was made assistant treasurer. Nine years later, in 1913, Mr. Fitts was elected treasurer. Mr. Douglas ,who since purchased Mr. Fisher's share in the company is at present manager of the plant, still located in Everett. Under the guidance of Messrs. Fitts and Douglas, the New England Structural Co. has achieved unusual success. It has furnished structural steel for more than 80 per cent of the major building projects in Greater Boston. It now fabricates in excess of 25,000 tons of steel annually, representing a yearly turnover of more than $2,000,000.

Mr. Fitts was born in 1870, in Norfolk, Va., where he remained until about 17 years of age. He won a

scholarship to the Massachusetts Institute of Technology. Removing to Boston, young Charles was unable to pursue his studies longer than one year. His father, who was a struggling music teacher in Norfolk, was unable to supply him with further funds and he decided to seek work. His first job was with the George E. Dunbar Co., Pearl street, Boston, selling mill supplies. He remained about two years, without noteworthy success. In 1890 he decided to seek other pastures. He joined the staff of the *Somerville Citizen*, a newspaper, which after a struggle of five years went out of existence. It was in the latter year that the tide of fortune seemed to change for Mr. Fitts and he finally located himself and his life work at the same time.

Mr. Fitts devotes all the time possible to his son and daughter and granddaughter. Other than these and his business, his chief enthusiasms are fishing and golf. He is past dictator of the Iron League of Boston, is a director of the Federal Mutual Liability Insurance Co., that city, and is active on many engineering committees.

Men of the Industry

J MURRAY RIDDELL, mining engineer, is now associated with Crowell & Murray Inc., consulting mining engineer, chemist, assayer and metallurgist, Perry-Payne Building, Cleveland. For the past 10 years he was identified with the Corrigan, McKinney Steel Co. as reporting engineer, assistant district superintendent of its Menominee range iron ore mines and general superintendent of its Kentucky coal mines. Mr. Riddell is a graduate of the Michigan college of mines, class of 1911. His work for the steel company has taken him to many parts of the United States and Canada reporting on coal, iron, manganese, lead, copper, silver and gold properties and deposits.

* * *

F. Ward Coburn recently was elected a director of the E. & G. Brooke Iron Co., Birdsboro, Pa., at a meeting of stockholders.

* * *

F. J. Phillips, for several years connected with the Concrete Steel Co., Boston, has resigned effective Dec. 10 to become manager of the Philadelphia office of the General Fireproofing Co.

* * *

J. F. Gaffney has resigned his 4-year connection with the Toledo Machine & Tool Co., Toledo, O., as foundry and pattern shop manager. No plans are announced for the future, his present headquarters being 2723 Monroe street, Toledo, O.

* * *

Veryl Preston, who resigned as president of the Eastern Steel Co., Pottstown, Pa., in May, 1919, and as president of the Cromwell Steel Co. in September, 1920, recently became associated with McClure Jones & Co., 115 Broadway, New York, a stock exchange house.

* * *

F. Edward O'Neil has been elected vice president and manager of the diesel division of the Fulton Iron Works Co., St. Louis, with headquarters in that city. For the past 11 years Mr. O'Neil has been in charge of the company's New York office. He was in charge of the corporation's shops in 1909 when the Fulton company built its first diesel engine.

* * *

Charles E. Wilson, formerly president of Delco-Remy Ltd., a subsidiary of General Motors Corp., has been appointed assistant to the president of General Motors, Alfred P. Sloan Jr. Mr. Wilson's temporary headquarters will be at Anderson, Ind.

J. MURRAY RIDDELL

* * *

L. B. Godfrey has been appointed eastern sales manager for the Cuyahoga Steel & Wire Co., Cleveland. His office will be located at 70 North Beacon street, Hartford, Conn. Mr. Godfrey has been connected with the machine tool industry for the past 10 years.

* * *

Charles J. Scullin, formerly foundry advisor of the St. Louis Gas & Coke Corp., St. Louis, has started an independent consulting and engineering laboratory under the name of Tucker-Scullin, Inc. Offices are in the Temple building, St. Louis.

* * *

A. W. Howe of the J. M. & L. A. Osborn Co, Cleveland, was re-elected president of the Armco Distributors' Association of America, which closed its fifth annual convention at Middletown, O., Dec. 6. G. W. Breiel of the American Rolling Mill Co., Middletown, continues as managing director.

* * *

George E. Johnson, who has been representative at New York for the Saginaw Stamping & Tool Co., Saginaw, Mich., was recently made general sales manager for that company. Manning, Maxwell & Moore, Inc., 100 East Forty-second street, New York, was recently appointed exclusive distributor in the New York territory for the Saginaw company.

* * *

H. M. Reed was elected first vice president and chairman of the executive committee of the Standard Sanitary Mfg. Co., Pittsburgh, at a special meeting of stockholders. R. E. Sargent was made a vice president and sales manager; and Theodore E. Muller was elected a vice president and general manager of factories. Mr. Sargent and F. F. Kaulbach were elected directors to take the places of J. W. Oliver and W. C Chamberlain

* * *

Charles A. Lampard has been appointed special sales representative in the New England states for the Poldi Steel Corp. of America. Mr. Lampard was previously connected with the Yale & Towne Mfg. Co., in charge of metallurgical work. Prior to this, he was connected with the Remington Arms-Union Metallic Cartridge Co., in charge of heat treating departments at Bridgeport, Conn., and with the General Electric Co., Schenectady, N. Y., as furnace and metallurgical specialist.

* * *

M. F. Tighe has been elected to

his tenth term as president of the Amalgamated Association of Iron, Steel and Tin Workers, Pittsburgh. David J. Davis was re-elected secretary-treasurer. Louis Leonard is assistant secretary and Ben I. Davis is managing editor of the *Amalgamated Journal*, the official organ of that body. Jacob S. McGinley continues as vice president of the boiling and finishing division and Edward W. Miller is vice president of the sheet and tin plate division.

* * *

W. P. Chrysler, head of the Chrysler Motor Corp., Detroit, was recently elected a director of the Thompson-Starrett Co. Inc., New York.

* * *

John J. Ott, since 1905 president and general manager of the B. Ott & Sons Co., LaCrosse, Wis., operating a machine shop and iron works, retired Dec. 1. The business is being continued by Gustav Ott, vice president, and F. A. Ott, secretary and treasurer. John J. Ott served his apprenticeships in the old E. P. Allis and Vilter Mfg. Co. plants in Milwaukee He joined his father in the Ott company as general superintendent in 1893, and became president upon the latter's death in 1905.

* * *

Homer C. Wallace has been transferred from the Indianapolis to the Cleveland office of the General Refractories Co., Philadelphia, coincident with the discontinuance of the Indianapolis office. The company's district sales agent there Maj. Arthur A. Wedderspoon has resigned to take up duties in London, Eng. Prior to the establishment in January, 1926, of the Indiana district sales office, Mr. Wedderspoon was identified with the company's Pittsburgh office.

* * *

H. A. Houston, Wilkinsburg, Pa., has been appointed works manager of the R. D. Nuttall Co., Pittsburgh, maker of gears. He is a graduate in mechanical engineering of Purdue university, and a post-graduate of the railway department of the University of Illinois. He served as apprentice, machinist and locomotive tester for the St. Louis & San Francisco railroad; mechanical engineer and trainmaster for the Chicago, Rock Island & Pacific railroad, and, since 1920, manager of mechanical parts, railway equipment engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., of which the Nuttall company is a subsidiary.

Production of basic open-hearth steel rails in 1901 was slightly over 2000 tons.

Obituaries

ROBERT CAMPBELL, 79, who died in a hospital at Gadsden, Ala., Dec. 4 after a two year illness, was a pioneer in the cast soil pipe industry of the South and builder of cast iron pipe plants in this country, England and India. He was born in Scotland but located in this country when 15 years old. Soon after he was apprenticed to the Noble Bros. Co., producer of cannon and other war munitions. After seven years he began to receive wages. In the early nineties he branched out into the soil pipe business. He designed and built plants in Gadsden, Bessemer, Talladega, Ala., Chattanooga, Tenn. and Rome, Ga. After the World war the British board of trade summoned him to build an American pipe plant for an association of 34 plant owners in Great Britain. When it began to operate, he built another in India. After five years in Scotland, he returned to Gadsden, Alabama, where he had lived for 49 years, and retired.

* * *

Michael J. Cleary, a contractor and builder, died suddenly at his home in Middletown, N. Y., Dec. 5.

* * *

William H. Wasweyler, president of the Milwaukee Brass Mfg. Co., Milwaukee, died Dec. 1. Mr. Wasweyler was born in Milwaukee in 1864 and became president of his company in 1892.

* * *

Thomas W. C. Hartmann, 58, of the Philadelphia sales force of the Eaton Spring & Axle Co., died of pneumonia in that city, Dec. 2. Mr. Hartmann until early this year was vice president of the Keystone Spring Co., Philadelphia.

* * *

J. E. Annis, 73, well known manufacturer of Chattanooga, Tenn., died Dec. 1. Mr. Annis has been identified with the industrial life of the city about 38 years. Mr. Annis was chairman of the board of the Cahill Co., formerly the Chattanooga Roofing & Foundry Co.

* * *

Irving R. Stanwood, who died recently, was affiliated with the Charles E. Bedeaux Co., New York. He was born in Needham Heights, Mass., in 1892, was graduated from Colby college, Waterville, Me., and then became affiliated with the Winchester Arms Co., New Haven, Conn. He later was with the Agar Mfg. Co., Somerville, Mass.

* * *

Willard R. Eaton, formerly president of the Richardson-Boynton Iron Works, Jersey City, N. J., died Nov. 17 at his home in Albuquerque, N. Mex., where he had been living the past year.

* * *

Harry W. Bury, superintendent of the foundry department of the Erie Foundry Co., Erie, Pa., died Nov. 23, after a week's illness. He had been in the employ of the company for 15 years and previously had been emploed by the Erie Engine Works and other Erie foundries.

* * *

Arthur Clarke Huidekoper, for many years active in transportation companies, died recently at his home in Meadville, Pa. He was president of the United States Steam Navigation Co., vice president of the Bessemer Railroad Co., and a director of several other transportation companies.

* * *

Henry O. Taylor, 54, founder and president of the Taylor-Tenoning Machine Co., Rockford, Ill., died Nov. 21 at St. Anthony hospital that city. He had been a resident of Rockford for 35 years and 18 years ago founded his company. He held several patents on special machinery..

* * *

Charles Seitz, 53, who was killed in an automobile accident Dec. 1, had been resident manager of the Addyston, O., plant of the United States Cast Iron Pipe & Foundry Co., for the past year. He had been in the company's employ for about 20 years, formerly superintendent at Scottdale.

* * *

Bertrand G. Mackey, who prior to his retirement in 1926 because of ill health had been purchasing agent for Goulds Pumps Inc., Seneca Falls, N. Y., died in that city Nov. 26. He was born at Locke, N. Y., in 1875. He became identified with the Gould company in 1906 as assistant purchasing agent and in 1908 was promoted to be purchasing agent.

Results of a recent investigation by the bureau of standards, Washington, show that blistering of enameled cast iron can be reduced by sand blasting the castings sufficiently to remove the surface skin.

Aircraft Prospects Seem Bright

Interest Manifested at International Aeronautical Exposition in Chicago Forecasts Construction of Flying Equipment Will Be a Record in 1929

WIDESPREAD interest was shown in the newest developments in aircraft and accessories at the International Aeronautical exposition conducted in the Coliseum, Chicago, Dec. 1-9. All leading airplane builders exhibiting at the show, as well as accessory and parts manufacturers, reported that business already in sight gives promise of a record year in the aircraft industry in 1929.

Sales of airplanes during the exposition exceeded the most optimistic expectations. An average of 25,000 people daily saw the exhibits during the nine days. Seventy-five airplanes, more than ever brought together previously in an exhibition, were shown. These were valued at over $2,500,000. Twenty-five airplane engines of various horsepower, weight and speed also were shown by 17 manufacturers.

The influence of the automobile industry on the aircraft models was a feature of the show. Dome and side lights, nickel and silver fittings were standardized in many cabin models. Upholstered chairs took the place of wicker chairs in some models. Strides in providing comfort in seating was evident in all mail and express ships.

Accessory Displays Numerous

The accessory divisions comprised 150 displays. Developments of aluminum and bronze alloy material for use in airplane manufacture and the introduction of special steel and tool steel hand tools were in evidence. Among the newer accessories were electrified flying suits, aluminum wings and aircraft brakes.

Leading the exposition in size were six tri-motored multi-passenger air transports. Other classes were six, five, four, three and two-passenger closed cabin planes, the two and three class open models and a group of tiny single place sport models.

Possibility of structural changes to increase the safety of flight occupied a conference sponsored by the aeronautical chamber of commerce and officials of the aeronautical branch of the United States chamber of commerce, which was attended by representatives of over 40 manufacturing companies.

Belief was expressed that the day of the four-motored transport plane is not far distant. A discussion developed as to how construction could be devised to seat passengers and pilots as far as possible from the propellor disks. A reciprocal arrangement for the exchange of information concerning commercial and war-type planes between the government and manufacturers was proposed.

Clarence L. Lawrence, president, Wright Aeronautical Corp., Paterson, N. J., was the guest of the aircraft manufacturers at a dinner, and in an address he declared that the aircraft industry now is on as sound and firm a basis as is the automobile industry. A number of foreign aviation experts invited to the exposition by President Coolidge arrived from New York in 11 planes. The first flight of Orville Wright 25 years ago was celebrated during the show and he was a guest of honor at the Chicago municipal dinner given for the several hundred foreign aviation visitors. This event was attended by 2000 guests.

Among exhibits of accessory manufacturers was one of Bendix Brake Co., South Bend, Ind., exhibiting new airplane wheels and brakes.

Aluminum Co. of America, Pittsburgh, had an extensive exhibit of airplane parts, including the new aluminum-alloy metal, coated on both sides with pure aluminum to prevent corrosion. This metal is used for both wings and fuselage, having a tensile strength of 55,000 to 60,000 pounds per square inch and 18 per cent elongation in 2 inches.

Timken Roller Bearing Co., Canton, O., had a most interesting and attractive exhibit, which included landing wheel roller bearings, railroad bearings now in use, as well as steel mill roll neck bearings with 10-inch bore and 15¾-inch outside diameter.

General Electric Co., Schenectady, N. Y., had an interesting display of airport beacons and aircraft lighting equipment. Westinghouse Lamp Co., New York, also had a display of beacons and lighting instruments. Westinghouse Electric Mfg. Co., East Pittsburgh, Pa., displayed beacons, gyroscopes, and 1500-3000-watt landing field floodlights.

Haskelite Mfg. Corp., Chicago, had an exhibit of wing and fuselage sections now being used by some plane manufacturers. Bohn Aluminum & Brass Corp. exhibited various types of bearings and its steel-backed babbitt-lined aircraft bearings. John A. Roebling's Sons, Trenton, N. J., displayed their wire products and welding wire for gas and electric welding. Austin Co., Cleveland, had on display a reproduction of the airport at Schenectady, N. Y. Several manufacturers showed newest designs in airplane hangar construction.

Standard Steel Propellor Co., West Homestead, Pa., had an exhibit of its aluminum-alloy propeller blades in a chrome-vanadium steel hub, the latter forged in one piece. Kawneer Co., Niles, Mich., showed its streamline tubing products. Norma-Hoffmann Bearings Corp., Stamford, Conn., showed diversified applications of antifriction bearings in aircraft.

Exhibits Malleable Hardware

Allith-Prouty Co., Danville, Ill., had an interesting exhibit of cast malleable hardware for hangars, including graphite bronze bearings for door top rollers and roller bearings for door bottom rollers. Snap-on Wrench Co., Chicago, and the Excello Tool & Mfg. Co., Detroit, exhibited airplane tools and wrenches.

The aeronautical division of the United States department of commerce had an interesting exhibit and disseminated much information on airport regulations and licensing.

Among exhibitors of aircraft engines were the Wright Aeronautical Corp., Paterson, N. J.; Fairchild Aviation Corp., Farmingdale, N. Y.; Aeronautical Products Corp., Naugatuck, Conn.; Axelson Machine Co., Los Angeles; Aircraft Engine Corp., Berkeley, Calif.; E. W. Bliss Co., Brooklyn, N. Y.; Brownback Motor Laboratories Inc., New York; Campbell, Peterson & Co., New York; Curtiss Aeroplane & Motor Co., Garden City, N. Y.; K. G. Frank, New York; Kinner Airplane Motor Corp., Glendale, Calif.; Michigan Screw Co., Lansing, Mich.; Marvin A. Northrop, Minneapolis, Minn.; Pratt & Whitney Aircraft Corp., Hartford, Conn.; Spartan Aircraft Corp., Tulsa, Okla.; Szekely Aircraft Corp., Holland, Mich.; Velie Motors Corp., Moline, Ill.; and Warner Aircraft Corp., Paterson, N. J.

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

WISCONSIN SCREW CO., Racine, Wis., has moved to larger quarters recently purchased, giving three times its former facilities. New equipment has been installed and additional new machinery is to be purchased. The company produces steel and brass cap screws, nuts and special automatic screw machine products. Stanley Keleske is president, John H. Leigler vice president and Paul P. Keleske secretary and treasurer.

* * *

CANTON STEEL FOUNDRY CO., Canton O., has been reorganized and will start operations Jan. 1. A. F. S. Blackwood is in charge.

* * *

READING CHAIN & BLOCK CORP., Reading, Pa., has moved its New York office from 11 Park place to 30 Church street.

* * *

STEEL PRODUCTS CO., Pittsburgh, iron and steel jobber, has completed removal of its plant from 1021-23 Beaver avenue, Pittsburgh, to 200 Bradley street, McKees Rocks, Pa.

* * *

HAJOCA CORP., 120 South Thirtieth street, Philadelphia, has leased property at Lewiston, Pa., for a factory branch and distributing plant. The present building will be remodeled and other units erected.

* * *

STRUTHERS WELLS-TITUSVILLE CORP., Titusville, Pa., has been formed to take over and consolidate Titusville Iron Works Co., and Titusville Forge Co., Titusville, and the Struthers-Wells Co., Warren, Pa. The new organization will carry out a general expansion program.

* * *

WP. LAYTHAM & SONS CO., Paterson, N. J., has completed installation of continuous molding equipment, placed by the C. O. Bartlett & Snow Co., Cleveland. The equipment is used for the production of relatively small ornamental iron castings and is designed to increase capacity without material enlargement of floor space. This is one of the few mechanically operated foundries in the metropolitan area of New York.

* * *

MAINE STEEL PRODUCTS CO., South Portland, Me., is producing all welded steel snow plows for use on trucks and tractors. Demand for this product comes from all parts of the northern half of the country and from many foreign countries. The company is now shipping an order of its plows to Russia.

* * *

NATIONAL SANDING MACHINE CO., 4551 Diversey avenue, Chicago, has been formed recently with $25,000 capital to manufacture and deal in machinery. S. W. Anderson is president, F. E. Berandt vice president and B. E. Handee secretary and treasurer. It is a reorganization of a firm founded in 1923.

* * *

TOLMIE MFG. CO., recently organized to manufacture automobile running boards, has occupied the plant formerly used by the Sylvester Tower Mfg. Co., 143 Broadway, Cambridge, Mass. C. L. McHugh is treasurer. In addition to running boards for standard makes of automobiles the company makes rustless and stainless steel molding.

* * *

ROBERT MITCHELL CO., Montreal, manufacturing building supplies, and railway equipment, is preparing to increase its output. Plans have been made for a foundry, where operations in iron, brass and bronze will be concentrated, including a laboratory and research offices. The company has bought a large site close to the railway.

* * *

BESSEMER ENGINE CO., Grove City, Pa., has undergone a change in control. Dr. E. J. Fithian and associates have bought 6000 shares of the company's stock from heirs of John Carruthers. Members of the Carruthers family already had retired from offices in the company. The concern was founded about 30 years ago and has been an important manufacturer of gas and oil engines.

* * *

RUSTLESS IRON CORP. of America, with plant at Baltimore and headquarters at 26 Broadway, New York, has concluded an arrangement whereby it becomes a licensee of the Chemical Foundation for producing 18 per cent chromium, 8 per cent nickel, steel alloy under the Benno Strauss patents. Rustless Iron Corp. will use its own process of introducing the chromium content direct from ore. The company will begin immediately producing ingots and billets of this alloy at Baltimore, and will make arrangements to have the billets rolled into the principal finished forms, including hot and cold-finished sheets, hot and cold-finished bars, hot-rolled plates, hot and cold-rolled strip and other forms.

* * *

NATIONAL FLUE CLEANER CO. INC., Groveville, N. J., has appointed the following sales representatives for its soot blower for fire tube boilers: McGee Sales agency, 75 Fremont street, San Francisco; Flickinger, Meyers & Rudolph, 129 West Second street, Los Angeles; Manufacturers Sales Service, Salt Lake City, Utah; W. A. Ramsay Ltd., Honolulu, Hawaii.

* * *

JONES & LAUGHLIN STEEL CORP., Pittsburgh, has sent its seventy-first tow of steel products by river to Memphis, Tenn. The steamer WARREN ELSEY now is on its way with a tow of seven barges with approximately 6500 tons of steel plates, wire products, reinforcing bars, seamless and welded pipe, and other products. Practically the entire tow is consigned to the warehouse of the corporation in Memphis.

* * *

MARTIN MACHINE WORKS, 2234 Walnut street, Chicago, has moved to its new plant from its former location at 228 South Laflin street. Motor rebuilding has been added to its business. Grinding of cylinders and crankshafts will be continued. Plans are under way for adding equipment to handle larger work than at present. The new plant is planned for additional space and another story.

* * *

DOMINION ENGINEERING WORKS Ltd., Montreal, has purchased the assets of Charles Walmsley & Co. (Canada) Ltd. The latter company was formerly a subsidiary of the British firm of Sir W. G. Armstrong Whitworth & Company Ltd. but some months ago passed into Canadian hands. Latterly its main line of production has been newsprint machinery, and other requirements of the pulp and paper industry.

Bethlehem Sues Corporation Over Structural Mill Patents

INFRINGEMENT of its patents on the Grey type mill for rolling special structural steel sections is alleged by the Bethlehem Steel Co. in an action brought against the United States Steel Corp. and its subsidiaries, the Carnegie Steel Co. and the American Bridge Co., in the federal court at Newark, N. J., Dec. 6.

An injunction and an accounting of the profits and damages, with a tripling of the damages as provided by federal statute, are asked. Sales of the special sections rolled by the Bethlehem company under the Grey patents are cited as totaling $250,000,000, thereby indicating the value placed upon the patents by the Bethlehem company.

Five patents granted to the late Henry Grey, dating back to 1903 and acquired by the Bethlehem company in 1904, are the basis of the suit. The patents cover the type of mill rather than the sections. The infringement charged by the Bethlehem company refers to the new structural mill completed at the Homestead works of the Carnegie company late in 1926. Since early 1927 the so-called Carnegie beam sections rolled on these new mills have been in sharp competition with the so-called Bethlehem sections.

Following is the bill of complaint:

First: American Universal Mill Co., a corporation of the State of South Dakota, having its principal place of business at Scranton, Pa., and Bethlehem Steel Co., a corporation organized and existing under the laws of the State of Pennsylvania, having its principal place of business at Bethlehem, Pa., bring this their bill of complaint against the United States Steel Corp., Carnegie Steel Co., and American Bridge Co.

Second: This suit is brought under the laws of the United States for infringement of letters patent.

Third: On March 23, 1904, Henry Grey, then residing in the City, County and State of New York, being within the meaning of the statutes of the United States then in force the inventor of new and useful improvements in rolling flanged metal beams or bars, and being entitled to a patent thereon under the provisions of said statutes, duly filed in the United States patent office an application for letters patent of the United States therefor, and on July 30, 1912, all the requirements of the statutes of the United States then in force having been duly complied with, letters patent of the United States No. 1,034,361 for improvements in rolling flanged metal beams or bars were duly issued to Henry Grey.

Fourth: Thereafter Henry Grey assigned the entire right, title and interest in and to the said invention and patent 1,034,361 to the American Universal Mill Co., New York, a corporation of West Virginia, predecessor of plaintiff American Universal Mill Co., except for such interest in the said invention and patent as had been acquired by plaintiff Bethlehem Steel Co., as will later appear.

Fifth: Thereafter American Universal Mill Co. of New York, assigned its entire right, title and interest in the said invention and patent No. 1,034,361 to American Universal Mill Co., plaintiff herein.

Sixth: Thereafter and on and about April 18, 1925, the plaintiff American Universal Mill Co. duly made application in writing to the commissioner of patents for a reissue of the said letters patent No. 1,034,362 . . . June 16, 1925, all the requirements of the statutes having been complied with, reissue letters patent No. 16,097, duly signed and sealed with the seal of the patent office, were duly issued and granted to the plaintiff, American Universal Mill Co., its successors and assigns, whereby the plaintiff American Universal Mill Co. became and now is the owner of the said reissued letters patent.

Seventh: On Sept. 14, 1903, Henry Grey, then residing in the City, County and State of New York, being within the meaning of the statutes of the United States then in force the inventor of new and useful improvements in solid rolled metal I-beam of 9 inches and under 12 inches in height, and being entitled to a patent thereon under the provisions of said statutes, duly filed in the United States patent office an application for letters patent of the United States therefor, and on Jan. 2, 1912, all the requirements of the statutes of the United States then in force having been duly complied with, letters patent of the United States No. 1,013,649 for solid rolled metal I-beam of 9 inches and under 12 inches in height were duly issued to the American Universal Mill Co., New York, predecessor of plaintiff American Universal Mill Co., as assignee of the said Henry Grey.

Eighth: On Sept. 14, 1903, Henry Grey, then residing in the City, County and State of New York, being within the meaning of the statutes of the United States then in force the inventor of new and useful improvements in solid rolled metal 8-inch I-beam, and being entitled to a patent thereon under the provisions of said statutes, duly filed in the United States patent office an application for letters patent of the United States therefor, and on Jan. 2, 1912, all the requirements of the statutes of the United States then in force having been duly complied with, letters patent of the United States No. 1,013,650 for solid rolled metal 8-inch I-beam were duly issued to the American Universal Mill Co., New York, predecessor of plaintiff American Universal Mill Co., as assignee of the said Henry Grey.

Ninth: On Sept. 16, 1903, Henry Grey, then residing in the City, County and State of New York, being within the meaning of the statutes of the United States then in force the inventor of new and useful improvements in solid rolled metal I-beam of 16 inches and under 25 inches in height, and being entitled to a patent thereon under the provisions of said statutes, duly filed in the United States patent office on application for letters patent of the United States therefor, and on Jan. 2, 1912, all the requirements of the statutes of the United States then in force having been duly complied with, letters patent of the United States No. 1,013,651 for solid rolled metal I-beam of 16 inches and under 25 inches in height were duly issued to the American Universal Mill Co., New York, predecessor of plaintiff American Universal Mill Co., as assignee of the said Henry Grey.

Tenth: On Sept. 16, 1903, Henry Grey, then residing in the City, County and State of New York, being within the meaning of the statutes of the United States then in force the inventor of new and useful improvements in solid rolled metal I-beam of 12 inches and under 16 inches in height, and being entitled to a patent thereon under the provisions of said

Contestants Are Silent

REQUESTS for a statement from E. G. Grace, president of the Bethlehem Steel Co., concerning the infringement suit against the United States Steel Corp. elicited the following from his office:

Mr. Grace says no statement seems necessary with respect to Bethlehem's action in filing suit against United States Steel Corp. and certain of its subsidiaries. As shown by the papers in the suit, Bethlehem's claim is that United States Steel Corp. and subsidiaries have been and are manufacturing and selling certain steel products for which Bethlehem holds patent rights controlling the machinery used, the process and the products and the purpose of the suit is simply to establish such claim.

Officials of the Steel corporation reserved comment until after the finance committee meeting late Tuesday.

statutes, duly filed in the United States patent office an application for letters patent of the United States therefor, and on Jan. 2, 1912, all the requirements of the statutes of the United States then in force having been duly complied with, letters patent of the United States No. 1,013,652 for solid rolled metal I-beam of 12 inches and under 16 inches in height were duly issued to the American Universal Mill Co., New York, predecessor of plaintiff American Universal Mill Co., as assignee of the said Henry Grey.

Eleventh: The said letters patents 1,013,649, 1,013,650, 1,013,651 and 1,013,652 have been duly assigned from the patentee American Universal Mill Co. to this plaintiff American Universal Mill Co., which assignments were recorded in the United States patent office on and are ready here in court to be produced.

Twelfth: American Universal Mill Co., the predecessor of plaintiff American Universal Mill Co., granted by an instrument in writing to the plaintiff Bethlehem Steel Co. the exclusive right to use the invention later patented in patent No. 1,034,361 and reissued as No. 16,097, in the manufacture of flanged metal beams or bars, and also the exclusive right to manufacture, use and sell the inventions later patented as letters patent 1,013,649, 1,013,650, 1,013,651 and 1,013,652, and the said rights were later confirmed by an instrument in writing executed by plaintiff American Universal Mill Co., and by reason of the said instruments and assignments the plaintiffs, American Universal Mill Co. and Bethlehem Steel Co., now own the entire right, title and interest in and to said letters patent, and in and to the inventions covered thereby, together with all accrued rights of action either at law or in equity by reason of past infringements arising in the six years last past.

Thirteenth: Plaintiffs aver that the inventions patented as aforesaid are of great commercial value and have been used extensively by the plaintiff Bethlehem Steel Company for many years past; metal beams and bars made by the plaintiff Bethlehem Steel Co. and embodying the said patented inventions have had a sales value in excess of $250,000,000; and that the public in general has acquiesced in the validity of the said letters patent and has recognized plaintiffs' right thereunder, and, except for the infringement of the defendants hereinafter complained of, the plaintiffs and the predecessor American Universal Mill Co. have had the exclusive enjoyment of said inventions.

Fourteenth: Plaintiffs are informed and believe, and therefore aver, that defendant United States Steel Corp. is the owner of all of the capital stock of defendant Carnegie Steel Co., and also of all the capital stock of defendant American Bridge Co.

Fifteenth: Plaintiffs are informed and believe, and therefore aver, that the defendants knew of the plaintiffs' aforesaid successful operations and the value of their business in making and selling the said flanged beams and bars, and also well knew of plaintiffs' exclusive rights by virtue of the said patents, but, nevertheless, without regard to plaintiffs' patent rights and without the license or consent of either of them, conspired and contrived together to use the inventions embodied in the said letter patent in making and selling metal beams and bars.

Sixteenth: Plaintiffs are informed and believe, and therefore aver, that pursuant to the control and direction of the United States Steel Corp., Carnegie Steel Co. began the construction at Homestead, Pa., of mills designed to utilize the invention of reissue patent 16,097, for the purpose of making and selling metal beams and bars embodying the inventions of patents 1,013,649, 1,013,650, 1,013,651 and 1,013,652, and the American Bridge Co. began preparations for fabricating and selling the said beams and bars upon the market; the said United States Steel Corp. at the time of the commission of the acts hereinafter complained of was controlling, and is now controlling, all of the acts and all of the property of the Carnegie Steel Co. and the American Bridge Co., and was and is now directing and controlling the operation and conduct of the said mills and businesses.

Seventeenth: Plaintiffs are informed and believe, and therefore aver, that the defendants, the United States Steel Corp., the Carnegie Steel Co., and the American Bridge Co., conspiring together and acting in conjunction, and well knowing the plaintiffs' aforesaid right did, within the six years last past, wrongfully and without license or consent of the plaintiffs, or either of them, infringe each of said letters patent, reissue No. 16,097, and Nos. 1,013,649, 1,013,650, 1,013,651 and 1,013,652, and threaten to continue so to infringe, and as an example of infringement plaintiffs allege that the defendants, conspiring together and acting in concert, have wrongfully and without license or consent of the plaintiffs, contrived to have the defendant Carnegie Steel Co. use the patented process and produce and sell beams and/or bars embodying the patented inventions set forth in each of the aforesaid letters patent at Homestead, Pa., and to have the defendant American Bridge Co. make arrangements for selling and sell a large portion of the beams and/or bars thus produced to the trade throughout the United States, and also to have the said American Bridge Co. sell to its customers such beams and/or bars in a fabricated condition.

Eighteenth: Plaintiffs have been informed and believe, and therefore aver, that the United States Steel Corp. has itself committed such acts of infringement in that it has authorized, directed and controlled, and is now authorizing, directing and controlling, the acts of the Carnegie Steel Co. and the American Bridge Co., herein alleged to be infringements of said letters patent, and has

(*Concluded on Page* 1546)

Success in Luxemburg Won Standing For Grey

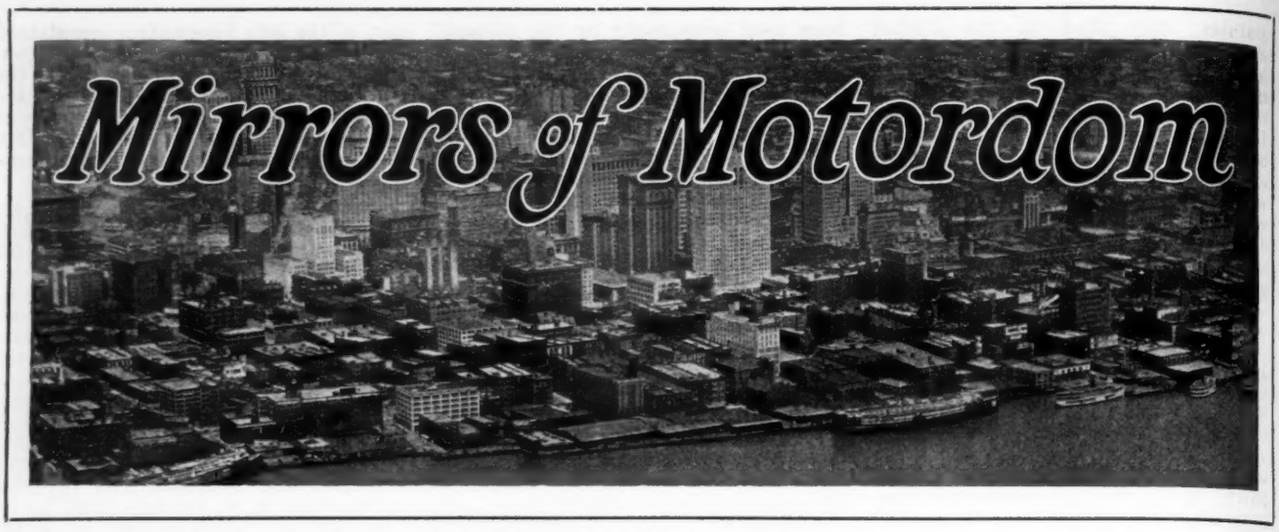
*REPORTS current in the industry for many months that the Carnegie Steel Co. would put on the market a new series of rolled steel beam and column sections first won official recognition when on Oct. 26, 1926, the late Judge E. H. Gary, chairman of the United States Steel Corp., said * * * "we are rebuilding the Homestead structural plant * * * and among other things are building a mill which will be prepared to manufacture a wide flange beam."*

*This prompted E. G. Grace, president of the Bethlehem company, to state that "although he had been informed that the structural steel mills at Homestead were being rebuilt he did not know what sections were to be rolled there, but he would not expect the United States Steel Corp. to infringe any of Bethlehem's patents. * * * Bethlehem has an exclusive license under numerous patents which have several years to run and which cover the process for rolling the so-called broad flange sections."*

Under date of Jan. 1, 1927, the Carnegie company issued a pamphlet announcing its new series of sections, ranging from 8 to 30 inches in depth from 6 to 16 inches in width, and from 21 to 305 pounds per linear foot in weight. Since then the series has been broadened. A detailed description of many of the sections appears in IRON TRADE REVIEW, *issue of Feb. 24, 1927.*

The Henry Grey over whose patents a great lawsuit is promised formerly was general superintendent of the Cleveland Rolling Mill Co., Newburgh, O. Strangely enough, this plant is now owned by the Steel corporation, being a unit of the American Steel & Wire Co. Later he went to Duluth where the Ironton Structural Steel Co., backed by New York capital, was attempting to roll a wide-flange I-beam. In 1897 a method was devised whereby the ingot was put through a blooming mill, breaking it down to about 2¼ inches thick at the webb. This was reheated and put through a finishing mill. Refinements were made but the basis was breaking down the ingot on the blooming mill.

Mr. Grey was retained to construct a structural mill in Luxemburg incorporating this method. This was completed in 1902. The Steel corporation investigated the process. Charles M. Schwab, then president of the Bethlehem company, got in touch with Mr. Grey and commissioned him to build a mill, which was put in operation in 1908, Mr. Grey died at East Orange, N. J., at the age of 64.



Bystanders May Be Hit in Chevrolet-Ford Contest

* * * * * * * * *

Ranks of Auto Manufacturers Are Fast Thinning

Detroit, Dec. 11

CHEVROLET'S announcement of 6-cylinder automobile may have sounded like a summons to an automotive Armageddon for Ford, but there is a growing opinion here it will be the noncombatants rather than Ford that will be carried off the field.

The lowest-price car in the market unquestionably will have its public, attracted and held by its relatively-cheap initial, operating and servicing cost. To oust Ford from this field seems impossible; at least Chevrolet, with the market practically to itself the greater part of a year, could not.

Chevrolet's abandonment of its 4-cylinder car in favor of a 6 may therefore be construed as an admission that, with Ford again in production, there is not room for both in the same field or that the next highest price plane is more promising. A 6-cylinder car priced a little higher than the Ford unquestionably narrows the market for the latter, and Ford may never attain his coveted 10,000 a day, but none here seriously doubts that Ford production will continue relatively large.

Providing, of course, that the new Chevrolet is a mechanical success, many here believe that the shafts of its competition will travel up rather than down. Its menace they reason is to the 6-cylinder cars up to the $1100 f.o.b. class. Already General Motors has set its own house in order so not to be caught in its own maelstrom. The new Pontiac is being stressed as a Big Six. Oldsmobile is understood to be coming out with an 8. Oakland has been dressed up to remove any comparison with lower-price cars of General Motors parentage.

In the line of fire will be Chrysler's new DeSoto and Plymouth, both of which have had big runs. Essex is being thoroughly renovated, and there may be a large and a small Essex, with the Hudson going to an 8. The Whippet 4 and 6 have been girded for the fray by many changes. The recent bargain sales on the Dodge standard model foreshadow a radical change.

* * *

FORD is now barely topping 6000 daily. November production is estimated at 112,000, the December schedule is 120,000 and that for January 154,000. Because it is in the change-over of models, Chevrolet's daily rate is meaningless, some divisions operating on the basis of 2000 daily while others are up to 4000. It is, however, aiming at 8000 daily, with orders flooding in from the first official showing of the new model last week in several large cities.

Ford is understood to have set 2,000,000 cars as his 1929 goal, and Chevrolet 1,250,000. Obviously some of this three million and more must be at the expense of other cars in the field, but if those beyond the immediate range of competition hold up their end a record total automobile production for 1929 would seem possible.

Only Ford, Willys-Overland, Durant and Chrysler are now producers of 4-cylinder cars. This type reached its pinnacle in 1923 when 3,086,000 or 82 per cent of all cars made were 4's. This percentage slipped gradually to 1927, when only 50.9 per cent were 4's but with the revival of Ford the percentage has risen to an estimated 52.3 this year.

* * *

IF THEY continue to beat the new gun, the 1929 automobile shows will be mere confirmations rather than presentations of new models. Already Chevrolet, Auburn, Reo, Chrysler, Oakland, Whippet, Duesenberg and Marmon have announced new jobs, with Oldsmobile and Pontiac immediate possibilities and some changes in the Dodge and Hudson-Essex lines impending.

The New York show, incidentally, will recall an impressive mortality among manufacturers. Only 24 American makers will exhibit 43 models in January—the lowest number since the automotive industry came of age. Four years ago there were 52 makers, with 63 models.

* * *

STEEL demand from the automotive industry is now describing a series of hills and valleys. Following the low point a week or ten days ago, specifications are slightly improved as new models get under way. As the holiday season approaches and those who have not taken inventory go down for this purpose, another dip is in prospect. The holiday over another modest climb will come, and then will follow a lull pending the popular verdict on the new models at the various shows. As a whole, steel shipments into this district are seasonally large, and some producers notice little change in the past sixty days.

* * *

ON THE basis of retail sales this year the lineup of the first ten automobile manufacturers is Chevro-

let, Ford, Willys-Overland-Whippet, Buick, Essex, Pontiac, Chrysler, Dodge, Nash and Studebaker-Erskine. If to Chrysler be added Dodge sales, then Chrysler-Dodge would rise to third place, pushing all makers from Buick down a notch. There is considerable comment that Chrysler is exerting more pressure on the steel price structure than any other manufacturer in the Detroit district.

Koppers Offers Stock

Pittsburgh, Dec. 11.—Offering of $20,000,000 of 6 per cent cumulative preferred stock of the Koppers Gas & Coke Co. by a syndicate of investment bankers headed by the Union Trust Co. of Pittsburgh, marks a further expansion of the Koppers Co. into public utility fields. On completion of the present financing, half interests in the Montreal Coke & Manufacturing Co. and the Hamilton Coke & Iron Co. will be acquired. The latter organization operates a coke plant and a blast furnace, selling its gas to the Columbia Gas & Electric Co. and its iron to the American Rolling Mill Co. which owns the other half interest.

The Koppers Gas & Coke Co. is a subsidiary of the Koppers Co. which was formed in January, 1927, to acquire the parent organization's holdings of stocks in utility companies. It also operates by-product coke plants valued at $28,316,203. The Koppers Gas & Coke Co. owns the Seaboard By-Product Coke Co., the Minnesota By-Product Coke Co. and the Connecticut Coke Co.

Machinery Exports Gain

The high total already reached by United States exports of industrial machinery the first nine months of this year was still further augmented by another large gain in October, according to the department of commerce.

Figures compiled by S. R. March, industrial machinery division, show that October made a $3,000,000 gain over the corresponding month last year to a total export valuation of $18,665,000 for the month. October's total, which was a 40 per cent gain over September, brought the year's total to $170,000,000 for the ten months, an increase of $18,745,000 over the first ten months of 1927.

Researches on the thermal expansion of beryllium alloys, stainless iron alloys, nickel, magnesium and magnesium alloys, and on sand-lime brick recently have been completed by the bureau of standards, Washington.

Congress Plans Tariff Hearings But Action Awaits Next Session

By Lynne M. Lamm

WASHINGTON, Dec. 11.—It did not take leaders of the second session of the seventieth congress, convening here Dec. 3, long to decide that the tariff would have to be revised. Therefore, taking the "bull by the horns" as it were, it was decided not to wait until later to hold hearings but to do so at once, thus establishing a precedent. In other words, one congress will hold hearings on the tariff and another one will enact the law based on these hearings.

According to official announcement made by the chairman of the ways and means committee of the house, Mr. Hawley, of Oregon, hearings are to begin before his committee Jan. 7 and they will be concluded Feb. 25. And concluded they must be at that time, in view of the fact that this session of congress goes out of existence a few days later, at midnight March 3.

Hearing Dates Set

Hearings on schedule 3, "metals and manufactures of," are set for Jan. 14, 15 and 16. Not only have these hearing dates been set but the subcommittee on metals has been appointed with the approval of the full committee. This subcommittee consists of Representative Bacharach, of New Jersey, chairman; and Representative Watson of Pennsylvania and Timberlake of Colorado.

So much for the actual things that have been done. The other things are being thought about and there seem to be as many opinions about them as there are congressmen. The main matter at issue is whether any extra session of congress, and it is pretty well assured that there will have to be an extra session, should be called early in the spring or whether it shall go over until the autumn, preferably September or October of next year. Some of the extremists are hoping that it will not be necessary to meet again until the regular session in December, 1929. This latter view, however, is held by only a few members.

It is the idea of the congressional leaders that if the ways and means committee complete its hearings by March 1, as scheduled, that by May the committee should be in a position to report out a completed tariff bill, which could be quickly passed by the lower house of congress.

The present thought is that the finance committee of the senate, just as soon as the bill is introduced in the house, could begin hearings on its own part, with the idea that the tariff bill will pass the house with few, if any, changes of moment. All of these ideas have for their ultimate consideration the fact that any tariff bill can now be quickly passed by congress in view of the present attitude of protection on the part of the democratic party.

Sight Delay in Tariff Revision

However, one cannot lose sight of the fact that the last tariff bill, that passed in 1922, took 22 months to go through the two houses of congress and become law, in spite of the predictions that were made that it would become law in less than a year after the hearings were begun.

One of the interesting and outstanding matters deserving consideration is the fact that insofar as can be learned, President-elect Mr. Hoover has not sent any word here which would indicate when if, at all, he will call an extra session.

The question of an extra session is wrapped up with the idea as to whether the present session takes action on farm relief, which will actually be relief. Mr. Hoover has gone on record, and he will stick to it, that if the present session does not take action on farm relief, he will call an extra session for that purpose. On the other hand, he has not said that he would call a special session for consideration of the tariff, if farm relief is taken care of. This is leading some of the members of congress who are anxious for a tariff revision, to delay farm relief.

Little information is reaching Washington as to the attitude of the iron and steel industry as regards tariff revision. The idea seems to have got about that the industry as a whole is not greatly interested. There has been some talk of an increased rate of duty on steel rails and cast iron pipe manufacturers are anxious for additional protection, but that seems to be the extent of the talk up to this time.

A report has been issued by the bureau of standards, Washington, on the effect of antimony, arsenic, copper and tin in high-speed tool steel.

Machinery

Miscellaneous Buying Supports Market as Year Closes—Orders of Size Not Expected Until After Jan. 1

REPORTS from important machine tool and shop equipment selling centers agree that the volume of business in December will fall short of the total for November, nevertheless activity is at a surprisingly high rate. Few large orders have been taken or likely will be before the close of the year; the bulk of current business consists of widespread purchases of a miscellaneous nature. Buying by the railroads is light, although a number are asking quotations presumably for the purpose of budget making. There are numerous indications that several inquiries will be placed before the trade after the first of the year. Most machine tool builders are operating at full capacity with overtime in some cases. A tendency is noted for some manufacturers to stiffen prices.

New York, Dec. 11.—Machine tool buying is featured by few outstanding orders; nevertheless, a good volume of miscellaneous business is being placed. Sellers assert there is little likelihood of trading this month being up to the volume of November, when Wright Aeronautical Corp., Paterson, N. J., closed on the great bulk of its current requirements which already have exceeded $500,000 and when one or two other eastern companies closed on substantial requirements, but they believe trading will be much better than in December a year ago. Railroad buying continues slack, although some of the carriers are asking figures on machine tools for estimating next year's budgets. In view, particularly, of the exceedingly light railroad buying in this district during the year, sellers generally anticipate a substantial improvement in this field during the coming year. Among active current inquiries are several machines for the New York Central, including a drilling machine, turret lathe and two grinders. Wright Aeronautical Corp. has purchased a few machines within the past week by way of rounding out its present requirements. R. Hoe & Co., this city, a good buyer until a week or so ago, is expected now to do little until after the first of the year at which time it is believed it will resume buying on a good scale. Otis Elevator Co. continues to issue inquiries not only for its domestic plants, but for some of its foreign plants as well. Overhead crane buying in this district is virtually nil.

Pittsburgh, Dec. 11.—Aluminum Co. of America has placed a 36-inch blooming mill for its Messina, N. Y. plant with the Mesta Machine Co. The order for a 24-inch structural mill for the same plant has gone to the Mackintosh-Hemphill Co. General demand for machine tools is fairly quiet, with most orders confined to only a few tools. Carnegie Steel Co. has a number of tools on a pending inquiry for its Duquesne works. Awards on the fourth quarter list of the Westinghouse Electric & Mfg. Co. are few.

Cleveland, Dec. 11.—Sales are holding up well in this territory despite the lateness of the season. Some dealers report better orders than in November, while others find the total slightly lower. Small orders from wide sources give evidence of wholesome activity after the beginning of the new year. Manufacturers continue busy with deliveries from four to six weeks as the best to be offered. Used equipment is finding a good market.

Chicago, Dec. 11.—Machine tool buying and inquiry are holding to a surprisingly high level for this season. Industrial inquiry both in the Chicago district and in Milwaukee territory is promising. Billing of tools this month is heavy on orders booked within the past 30 days. The present volume of business is only slightly behind the high level of the past five months. A northeastern Ohio manufacturer purchased three lathes in this district, one 16-inch and two 21-inch. A. O. Smith Corp., Milwaukee, is inquiring for a horizontal boring and drilling machine and several other tools. A road machinery builder in the Milwaukee district is expected to issue a list after the first of the year. Punch presses and drills were active during the week. No fresh railroad inquiry has appeared. Most of the western roads have cleaned up their business for the year. A tendency is noted among some manufacturers of machine tools to stiffen prices.

St. Louis, Dec. 11.—Railroad buying has stimulated activity in the machine tool market here. Missouri Pacific Lines, particularly, is inquiring for considerable equipment for its Southwestern division. Frisco, Katy and other Southwestern roads are in the market with considerable buying in prospect before the year is out. Dealers report business much improved in November over the previous month. Southwestern oil field business, usually brisk in the St. Louis market but slowed down for the last several months, shows signs of stimulation with inquiries for lathes and pipe threading machinery assuming larger proportions.

Bethlehem Sues, Alleging Patent Infringement

(*Concluded from Page* 1543)

participated in the profits resulting from the manufacture, sale and/or use of the beams and/or bars herein alleged to be in infringement of all the patents aforesaid.

Nineteenth: Plaintiffs have been informed and believe, and therefore aver, that the defendant Carnegie Steel Co., wrongfully and without the license and consent of the plaintiffs, has manufactured and sold both directly to customers and to and through the defendant American Bridge Co., and is now so manufacturing and selling the beams and/or bars herein alleged to be in infringement of said patents under the direction of United States Steel Corp., and has participated in the profits resulting from the manufacture, sale and use of the beams and/or bars herein alleged to be in infringement of all the patents aforesaid.

Twentieth: Plaintiffs have been informed and believe, and therefore aver, that the American Bridge Co. has fabricated and sold in both erected and unerected condition a large part of the beams and/or bars manufactured by the Carnegie Steel Co. herein alleged to be in infringement of said patents and is fabricating and selling a large part of the beams and/or bars manufactured by the Carnegie Steel Co. herein alleged to be in infringement of said patents and under the direction of the United States Steel Corp. has arranged for the fabrication, sale and/or use of such product and has participated in the profits resulting from the manufacture, sale and/or use of the beams and/or bars herein alleged to be in infringement of all the patents aforesaid.

Twenty-first: The defendants have been duly notified of the said infringement, but nevertheless have continued to infringe since said notice, whereby the defendants, and each of them, have profited and the plaintiffs have been damaged.

Plaintiffs therefore pray:

1. For an injunction and a preliminary injunction pending this suit, restraining the defendants, and each of them, and the officers, servants and agents of each of them, from infringing said letters patent.

2. For costs and an account of profits and damages and that any damages assessed may be tripled.

3. For such other and further relief as the circumstances of the case may require.

CRANE ORDERS PLACED

2-ton electric overhead crane for Froment & Co., iron and steel jobbers, New York, to an unnamed seller.

7½-ton crawler with convertible motor truck attachment for C. G. Bartlett, Buenos Aires, Argentina, to Universal Crane Co.

In 1927 the sales of abrasive garnet by producers in the United States amounted to 6939 short tons, valued at $573,525.

CONSTRUCTION and ENTERPRISE

Concise Timely Business Building Opportunities from Field of Industry

North Atlantic

BROCKTON, MASS.—Brockton Edison Electric Illuminating Co., 42 Main street, plans the construction of a substation on Riverview street.

NEW BEDFORD, MASS.—Firestone Cotton Co., subsidiary of the Firestone Tire & Rubber Co., Akron, O., plans the installation of power equipment in connection with extensions and improvements at its plant.

ROXBURY, MASS.—Boston Elevated Railway Co., 31 St. James avenue, plans the construction of a 1-story service garage, boiler house, repair shop, etc., 80 x 150 feet.

SOUTH BOSTON, MASS.—Andrew Square Terminal Co. Inc., 53 State street, plans the construction of a 4-story industrial building, 75 x 430 feet, including power house, coal handling machinery, etc.

SAYREVILLE, N. J.—Work will be started at once by the Eastern New Jersey Power Co. on the erection of a power plant, the initial capacity of which will be 60,000 kilowatts. Plans allow for the increase of this capacity to 180,000 kilowatts as demands justify. The builder is a subsidiary of the Utilities Power & Light Co.

TRENTON, N. J.—State board of education plans the installation of power equipment at its proposed new state normal school to be built at Hillwood Lakes.

BUFFALO—M. Hayman & Co., 856 East Ferry street, E. M. Hayman, president, has awarded the general contract for a 1-story foundry addition to H. F. Stimm Inc., Ellicott Square.

HASTINGS-ON-HUDSON, N. Y.—Hastings Paving Co. plans to install power equipment in connection with the rebuilding of its plant damaged in a recent fire.

LAUREL HILLS, N. Y.—Nichols Copper Co. has awarded the contract for the construction of a plant, 58 x 278 feet, to Leddy & Moore, 70 West street, New York. (Noted Nov. 29).

MACHIAS, N. Y.—Machias Foundry & Machine Co. incorporated recently advises that it plans the construction of a plant and the purchase of machinery. (Noted Dec. 6).

MASSENA, N. Y.—Aluminum Co. of America has awarded the contract for structural steel for mill buildings to McClintic-Marshall Co. (Noted Nov. 29.)

ALLENTOWN, PA.—Board of trustees, Cedar Crest college, plans the construction of a boiler plant. Jacoby & Everett, Allentown, are architects.

PHILADELPHIA—National Umbrella Frame Co., Bellefield and Penn avenues, has awarded the contract for a 2-story plant, 60 x 183 feet, to Truscon Steel Co.

PHILADELPHIA—Ajax Metal Co., 46 Richmond street, has awarded the contract for a 2-story machine shop, 52 x 56 feet, to M. Ward Easby, 1505 Race street. (Noted Nov. 29).

PITTSBURGH—Duquesne Light Co., Sixth avenue, has let the contract for a power plant to be built on Brunots Island, to H. M. Byllesby Engineering & Management Co., 231 South LaSalle street, Chicago. (Noted Oct. 4.)

East Central

BELLEVILLE, ILL.—Roesch Enamel Range Co. contemplates the construction of a 1-story manufacturing plant, 100 x 150 feet.

CHICAGO—Western Screw Mfg. Co., 4413 West Kinzie street, has awarded the contract for a 1-story plant, 25 x 99 feet, to A. Larson, 19 South LaSalle street.

CHICAGO—Continental Can Co., 111 West Washington street, has awarded the contract for concrete reinforcing bars for a plant addition to Olney J. Dean & Co.

CHICAGO—Sprague Iron Works, 4400 Addison street, E. G. Johnson, engineer, is taking bids for the construction of a 1-story plant addition.

CHICAGO—Storkline Furniture Corp., 4400 West Twenty-sixth street, plans the installation of power equipment in its new plant. R. B. Kurzon, 105 West Monroe street, is architect.

CHICAGO—University of Chicago received bids until Dec. 10 for its 2-story power house at Sixty-first street and Blackstone avenue. Neiler-Rich Co., 431 South Dearborn street, is engineer. (Noted Sept. 27.)

ELGIN, ILL.—Elgin Stove & Oven Co., 667 North State street, plans the construction of a 1-story manufacturing plant addition, 50 x 135 feet.

EVANSTON, Ill.—Board of local improvements, City Hall, H. M. Hanford, president, plans the construction of a municipal electric light and power plant. City engineer is in charge of the work.

VANDALIA, ILL.—State of Illinois, department of purchases, Capitol building, Springfield, plans the construction of a laundry, power house and water tank addition.

DETROIT—Murray Corp. of America, Russell avenue and Aberle street, plans construction of a plant in Memphis, Tenn. The plant will be erected on a 45-acre tract, already purchased by the company. The first unit will be a building 525 x 640 feet and is expected to be completed by April 1, 1929.

PONTIAC, MICH.—Oakland Motor Car Co.

Resale Equipment News

PLANT of the former Standard Turbine Corp. at Scio, (Wellsville), N. Y., will be sold at absolute auction Dec. 20 by Industrial Plants Corp., New York. The machinery will be sold piecemeal and separate from the land and buildings. This sale marks the end of the corporate existence of the Standard Turbine Corp. and the Scio Mfg. Co. Equipment includes lathes, shapers, planers, milling machines, drills, cranes, boring mills, turbines, generators and other tools.

* * *

Assets of the McMyler-Interstate Co., Cleveland, have been ordered sold in forclosure by the receiver. After appraisal a date for the sale will be set. The company is a large manufacturer of steam shovels, pile drivers, excavating machinery, steel forging and other products. The receivership is friendly and for the purpose of clearing up the situation, assets being greater than the liabilities.

Sales Calendar

Dec. 20—Auction sale of entire plant of Standard Turbine Corp., Scio, N. Y.

Dec. 21—Sale of navy surplus waste material at Fort Ontario, N. Y., postponed from Dec. 10.

Dec. 31—Auction navy surplus and surveyed materials at New York navy yard.

has a number of building projects for which permits were issued recently, including a foundry addition, coremaking building, cupola building, cleaning building, pattern shop, and storage building and mixing building.

CANTON, O.—City of Canton plans the establishment of an airport.

CLEVELAND—National Acme Co., East 131st street and Coit road, plans the construction of a plant addition.

CLEVELAND—Dawson Iron & Wire Co., 3106 East Sixty-third street, is building a plant addition, 46 x 92 feet.

CLEVELAND—Ford Motor Co., Fordson, Mich., is adding a car repair building and ramp to its branch plant at 11610 Euclid avenue.

CLEVELAND—Wheeler Radiator Co., 1637 Collamer road, is completing plant and warehouse additions to its plant here.

CLEVELAND—Wellman Bronze Co., 6017 Superior avenue, has absorbed the Ideal Bronze Co. and the plant of the former is to be enlarged.

CLEVELAND—Superior Die Casting Co., 875 East Seventieth street, has doubled the space in its plant here. Additional facilities will be completed soon.

CLEVELAND—Dual Speedometer Co., 757 Leader building, has been organized and is preparing for the manufacture of a new type of speedometer. M. Beller is president.

CLEVELAND—Great Lakes Aircraft Corp., care the Guardian Trust Co., Buhl building, Detroit, contemplates the construction of an addition to the former Glenn Martin plant here.

CLEVELAND—Central Wire Nail & Specialty Co. soon will begin operations in its plant at East Seventy-first street and Quincy avenue, to manufacture wire and special nails for the automobile and airplane industries.

CLEVELAND—United States Air Lines, a new corporation, has taken offices in the Terminal Tower building and is speeding construction of a hangar and service building at the Cleveland airport, to be completed in March. Clifford Gildersleeve is manager.

CLEVELAND—Precision Castings Co. Inc., J. W. Millspaugh, Keith building, building a large new plant here, has purchased the P. & R. Tool Co. Inc., Worcester, Mass., to be consolidated with the local plant. (Noted Nov. 29).

CLEVELAND—Swartwout Co., 18511 Euclid avenue, has purchased a large building at that number and plans to expand production activities in the manufacture of ventilators and industrial ovens, beyond present capacity of its plant at Orrville, O., and its acquired quarters.

CLEVELAND—Gluntz Brass Co., 3001 East Fifty-fifth street, has acquired a larger foundry and buildings in the Miles avenue district, and plans the construction of a new machine shop to increase production space to 22,000 square feet.

CLEVELAND—W. S. Tyler Co., 3615 Superior avenue, manufacturer of woven wire screens, screening and wire equipment and ornamental wire and bronze, plans the construction of a plant at St. Catherines, Ont., in the spring, where the products named above will be manufactured. Proctor Patterson is president of the company and has closed an option on 15½ acres in St. Catherines.

COLUMBUS, O.—Columbus Aircraft Corp., recently incorporated, has the preparation of plans under way for an airplane mnufacturing plant. The building will be erected on a 5-acre tract adjoining the municipal airport which is to be built shortly. (Noted Oct. 4).

DELAWARE, O.—International Derrick & Equipment Co., operating a foundry here on Toledo street, is making ready to start an expansion program. An addition 70 x 150 feet, will be built.

EUCLID, O.—Geometric Stamping Co. has awarded the contract for fabricating structural steel for a new plant to Austin Co., 16112 Euclid avenue, Cleveland. (Noted Nov. 29.)

EUCLID, O.—Chase Brass & Copper Co. has awarded the contract for structural steel for its new plant to Austin Co., 16112 Euclid avenue, Cleveland. (Noted Nov. 29.)

WILLOUGHBY, O.—Village of Willoughby plans the construction of an addition to its water plant.

YOUNGSTOWN, O.—Truscon Steel Co., Julius Kahn president, has started work on a new warehouse in Newark, N. J.

MILWAUKEE—Hardtke Auto Exchange, 4501 Wisconsin avenue, has let contracts for the erection of a 2-story shop addition, 50 x 80 feet, to be ready about Feb. 1.

MILWAUKEE—A 5-story addition, 30 x 120 feet, will be made to the present 5-story building, 120 x 120 feet, of the Nash Sales Co. Inc., Broadway and East Wells streets, to give more service and storage space. Rudolf Hokanson is president.

PORTAGE, WIS.—Portage Cooperative Food Products Co. plans to install power equipment in 2-story canning plant.

RACINE, WIS.—Alvord, Burdick & Howson, Chicago, have been selected as consulting engineers on the sewage disposal plant project which this city is undertaking. The company recently completed preliminary surveys and estimates and is now making working plans. The tank type will be employed, requiring a large quantity of pumping equipment. First contracts probably will be let Feb. 1 or 15. Charles Beaugrand is city engineer.

RICHLAND CENTER, WIS.—Allis-Chalmers Mfg. Co., Milwaukee, is successful bidder for furnishing a turbo-generator, condenser, etc., for the city water and light plant. The cooling tower will be furnished by the Standard Power & Equipment Co.

TWO RIVERS, WIS.—Preliminary work is being done toward the enlargement of the local plant of the Aluminum Goods Mfg. Co., Manitowoc, Wis. The work is in charge of Lockwood, Greene & Co., Chicago engineers. Work recently was started on a 7-story addition, 115 x 300 feet, to the Manitowoc plant.

WAUKESHA, WIS.—Having acquired the site, the Waukesha board of Vocational education is preparing to select an architect for the proposed new vocational school. H. L. Horning, chief engineer of the Waukesha Motor Co., is president of the board.

Canada

GRAND FORKS, B. C.—Hercules Consolidated Mining, Smelting & Power Corp., is having plans prepared by its own engineers for the construction of an ore concentrator plant.

WINNIPEG, MAN.—On recommendation of the committee on public utilities, the city council has awarded contract to the Swedish General Electric Co. Ltd., Toronto, Ont., for the manufacture, delivery and erection at Slave Falls, Man., of two 10,000 kilovolt ammeter generators and two 450 kilovolt ammeter generators, complete with accessories and spare parts.

GODERICH, ONT.—Dominion Road Machinery Co. Ltd. has started work on an addition to its plant here to increase manufacturing facilities 75 per cent. The increased demand for road machinery and equipment has made the extension necessary, according to Thomas Mitchell, general manager.

TORONTO, ONT.—Queen City Dental Manufacturers Ltd., 112½ Carlton street, contemplates building a manufacturing plant on Hayden Street here.

TORONTO, ONT.—Canada Metal Co. Ltd., 29 Fraser avenue, has purchased a site on the West side of Fraser avenue, 220 x 266 feet, where it will build an addition to its plant.

TORONTO, ONT.—Smith Bros., 183 Duke street, manufacturers of truck and motor car bodies, have purchased a site at the corner of Logan avenue and Keating street, and will erect a manufacturing plant.

TORONTO, ONT.—McColl Frontenac Oil Co. Ltd., 114 Don Esplanade, has purchased the old Baldwin Steel Co. premises on Ashbridges Bay here, and propose to remodel building next spring to be used for refining plant.

TORONTO, ONT.—Dominion Radiator & Boiler Co., 1322 Dufferin street, has awarded contracts for construction of cupola pits as follows: Steel, Dominion Bridge Co., Redford building; excavation and concrete work, Thomson Bros., 56 Grenville street.

SAULT STE. MARIE, ONT.—G. A. Sims, of the department of Indian affairs, Ottawa, Ont., announced that negotiations are practically completed for the operation of the Garden River Trap Rock deposits by a company headed by Perry E. Waworth of the Dominion Trap Rock Co., of Bruce Mines. The proposed plant is to be completed by Dec. 1, 1929. Construction work is to be started as soon as organization has been completed. The full capacity of the proposed plant will be 5000 tons per day. Steam shovels and other equipment will be purchased.

MONTREAL, QUE.—Electrolier Mfg. Co., 5849 Boyer street, has let contract to E. Barabe, 1442 St. Dominique street, for the erection of a factory here. Building to be 2-story, 70 x 94 feet.

MONTREAL, QUE.—Canada Metal Co., main office, Toronto, Ont., has awarded contract to the Dakin Construction Co. Ltd., 270 Beaumont street, for the erection of a 1-story plant on Hutchison street, here.

Western States

PUEBLO, COLO.—Colorado Fuel & Iron Co. plans the installation of power equipment in its proposed iron ore treating and concentrating mill at Sunrise, Wyo.

GREAT FALLS, MONT.—Montana Power Co. has awarded contracts for construction of the Morony hydroelectric plant on the Missouri river to the Phoenix Utility Co., of New York. The plant is designed to develop 70,000 horsepower.

PORTLAND, OREG.—A reinforced concrete warehouse at Savier and Fourteenth streets will be built for the Wickwire-Spencer Steel Corp.

PORTLAND, OREG.—Broderick & Bascom Rope Co., manufacturing steel cable, will erect a one-story concrete construction office and warehouse structure at Eighteenth street and Upshur street.

PORTLAND, OREG.—Inland Power & Light Co. has applied to the government for a preliminary permit providing for development of a 33,000 horsepower hydroelectric on Lewis river, Clark county, Wash.

SEATTLE—Austin Co. has completed plans for a transformer house of concrete and steel construction to be built at the plant of the Boeing Airplane Co., 306 West Front Street.

SEATTLE—Preliminary to its program of expansion, Isaacson Iron Works has awarded a contract for driving piles for a waterfront pier to the McEachren Construction Co. (Noted Dec. 6.)

SEATTLE—Pacific Radiator Shield Co., 15 Nickerson street, will add one story to its plant, doubling its present floor space. The firm is branching out into the manufacture of metal furniture for which No. 22 to 14 gage furniture steel is used.

SHELTON, WASH.—An independent power plant is under construction for the Reed cedar lumber mill. The building will be of concrete and the plant will include a 750 horsepower generator with steam to be supplied by two 300 horsepower boilers.

Southern States

BIRMINGHAM, ALA.—American Cast Iron Pipe Co. has let the contract for steel for its plant addition to Southern Steel Works Co., 908 Lucien avenue.

JEFFERSONTOWN, KY.—Continental Lumber & Mfg. Co., Jefferson building, plans to install power equipment in its proposed plant unit.

LAUREL, MISS.—Masonite Corp. plans the installation of power equipment in its new plant addition, to include a high pressure boiler and accessories.

CHATTANOOGA, TENN.—Tennessee Electric Power Co. plans the construction of four new substations and additional transmission lines. Stevens & Wood Inc., 120 Broadway, New York, is engineer for the project.

BEAUMONT, TEX.—B. Sampson, 1530 Broadway, has acquired a site at Crockett and Holmes street on which he will erect a machine shop and warehouse.

CORSICANA, TEX.—City of Corsicana has leased 75 acres of land near the city limits and will construct hangars and install equipment.

HOUSTON, TEX.—W. D. Haden Co., American National Insurance building, Galveston, plans the installation of power equipment in its new lime plant.

SAN ANTONIO, TEX.—Alamo Iron Works, Montana and Lafayette streets, plans the construction of a new pipe shop.

West Central

HUTCHINSON, KANS.—City of Hutchinson and chamber of commerce contemplate the establishment of an airport.

LEAVENWORTH, KANS.—Kansas Electric Power Co., Lawrence, Kans., plans the construction of a steam operated electric generating plant here.

COKATO, MINN.—Common council contemplates the construction of a municipal electric light and power plant.

MINNEAPOLIS—Diamond Iron Works Inc., 1728 North Second street, contemplates the construction of an addition to its foundry. G. A. Bingenheimer is president.

MINNEAPOLIS—Northwestern Metal Ware Co. has let contract to Field-Martin Co., 720 South Sixth street, for a 2-story plant addition at Central avenue northeast and Fourteenth street.

MINNEAPOLIS—O. B. McClintock Co., O. B. McClintock, president, 139 Lyndale avenue north, manufacturer of burglar alarm systems, etc., has let general contract to Maurice Schumacher, 104 South Ninth street, for a 2-story factory, 40 x 110 feet.

MINNEAPOLIS—St. Barnabas hospital, George S. Grimes, president of board of trustees, will soon receive bids for a 2-story power plant and laundry building at Sixth street and Tenth avenue south.

MINNEAPOLIS—Minneapolis Gas Light Co., John K. Swanson, vice president and general manager, 16 South Seventh street, will build a gas holder of 3,000,000 cubic feet capacity. The company will also build a 3-story meter building at Fourteenth avenue south and Mississippi river.

MONTGOMERY, MINN.—Minnesota Valley Canning Co. will receive bids soon for canning factory equipment to include boiler, stokers, smoke stack, pipe fittings and valves, pump equipment, motors, transmission lines, etc. Ralph W. Richardson, 301 Zenith building, is consulting engineer.

ST. PAUL—Valley Iron Works Co. has let general contract to Lauer Bros., 431 Gilfillan block, for a 1-story foundry addition, 40 x 60 feet, at Livingston avenue and River street.

ST. PAUL—Watkins Mfg. Co., E. A. Watkins, president, Wichita, Kans., contemplates building an airplane factory near the St. Paul municipal airport.

ST. PAUL—Donaldson Co. Inc., F. A. Donaldson, president, 693 Raymond avenue, manufacturers of sheet metal products, will soon build a 1-story factory addition, 55 x 100 feet.

HANNIBAL, MO.—St. Louis & Hannibal railroad suffered damages to its car and machine shops in a recent fire.

KANSAS CITY, MO.—Standard Steel Works is erecting shop additions, 80 x 118 feet and 100 x 116 feet, for manufacture of airplanes at its North Kansas City plant.

LUXEMBURG, MO.—Titanium Pigment Co., 1 Sidney street, has awarded the contract for a power house, 70 x 80 feet, to Fruin-Colnon Construction Co., Merchants-Laclede building, St. Louis.

ST. LOUIS—Century Electric Co., 1806 Pine street, is building a foundry addition.

ST. LOUIS—Copper Clad Malleable Range Co., 821 North Second street, contemplates additions to foundry.

ST. LOUIS—Wm. A. Miller Elevator & Machine Works, 920 North Main, has erected a 50 x 150 foot addition to machine shop.

ST. LOUIS—Structural steel for a boiler house for Barber Asphalt Co., International Life building, has been awarded to McClintic-Marshall Co.

ST. LOUIS—Duke Mfg. Co., manufacturer of hotel equipment, 123 South First street, has completed improvements on its new building, 100 x 140 feet, at 2222 North Ninth street, where it has moved its plant.

ST. LOUIS—Cahill Mfg. Co., 1112 Market street, manufacturer of plumbing and heating supplies, is making improvements on a 4-story building at 1013 Choteau street and plans to

move its plant there from its present location.

OGALLALA, NEBR.—Goodall Electric Mfg. Co. has started work on a 1-story factory, 75 x 120 feet.

WINNER, S. DAK.—Chicago & North Western railroad, 226 West Jackson boulevard, Chicago, is making surveys for a 40-mile railroad extension between Winner and White river.

YANKTON, S. DAK.—Federal Public Service Corp., owner of the Yankton Light & Heating Co., has started work on improvements to light and heating plant, including new tank holder for gas, tar separator, 2 new purifiers, improvements to gas machine, 150-horsepower steam boiler, new piping and stacks.

Recent Incorporations

BOSTON—Auto Sickle Co. has been incorporated with $400,000 capital to manufacture lawn mowing machinery, blades, tools, etc., by Herbert B. Newton, 60 Mason Terrace, Brookline, Mass.

BOSTON—New England Air Transport Co. has been incorporated with $100,000 capital to construct and equip airplanes, etc., by Patrick J. Madigan, 266 Corey street, West Roxbury, Mass.

BOSTON—Blake Process Machine Co. Inc. has been incorporated with 1000 shares no par value stock to manufacture and deal in machinery, devices, etc., by Terrell M. Ragan, 85 Devonshire street, Boston.

BOSTON—Modern Bronze Inc. has been incorporated with 300 shares no par value stock to manufacture all kinds of bronze and metal products by Edward T. Ryan, 30 Kirkwood road, Brighton, Mass.

LYNN, MASS.—Cutting Die & Machine Co. of America Inc. has been incorporated with $625,000 capital to manufacture and deal in dies, tools, machines, apparatus, etc., by James V. Knox, Lynn.

CHICAGO—W. & B. Co., 1300 East Ninety-second street, has been incorporated with 200 shares no par value stock to manufacture and deal in automatic coupling devices, safety appliances, etc., by Charles E. Clark and Franklin Raber.

CHICAGO—Kroeker Consolidated Inc., 77 West Washington street, has been incorporated with 2000 shares no par value stock to manufacture and deal in motor devices, airplane parts, etc., by Balford Q. Shields, James Marnell and Jean Thiessen.

DETROIT—Dunning Mfg. Co. has been incorporated with 62,500 shares no par value stock to manufacture and deal in hydraulic shock absorbers and all kinds of machinery.

NASHVILLE, TENN.—Southern Boiler & Tank Works Inc. has been incorporated with $50,000 capital by Lehn Galella and T. S. Stanton.

VANCOUVER, B. C.—Fluid Gauges (Canada) Ltd. has been incorporated to manufacture and deal in safety fluid gages, with $200,000 capital by Henry Hendriks, Thomas D. Hill, Henry Marshall and others, all of Vancouver.

New Incorporations In Separate Listing

AS NEWS of the incorporation of a concern in the metal-working field is a direct lead to a prospective buyer of various lines of products included in the field of IRON TRADE REVIEW, *notice of such incorporations, as received from various secretaries of state, are being segregated from other news in the Construction and Enterprise department. This makes reference easier for those who regard these leads as more important than others. The arrangement is alphabetical by states.*

WINNIPEG, MAN.—W. J. Horton Industries Ltd. has been incorporated to manufacture and deal in agricultural implements, with 200,000 shares of no par value stock by William J. Horton, William J. Wilson, William L. B. Conley and others, all of Winnipeg.

GEORGETOWN, ONT.—Georgetown Foundry & Machinery Co. Ltd. has been incorporated to carry on the business as iron maker, steel maker, steel convertor, etc., with 800 shares of no par value stock by Richard H. Sankey, Lorne C. Lee and William G. Tucker, all of Toronto.

HAMILTON, ONT.—Kerr Metal Products Ltd. has been incorporated to carry on the business as brass and iron founder, engineer, and manufacturer of metals, with $40,000 capital by Thomas H. Simpson, Frederick R. Murgatroyd, Eva Ambrose, all of Hamilton.

TORONTO, ONT.—Fruehauf Trailer Co. of Canada Ltd. has been incorporated to manufacture and deal in motors, motor trucks, trailers, and motor vehicles with $50,000 capital by August C. Fruehauf, Harvey C. Fruehauf, Harry R. Fruehauf, all of Detroit.

TORONTO, ONT.—Ruths Steam Storage (Canada) Ltd. has been incorporated to manufacture and deal in apparatus, devices and equipment for the production and disposal of steam and electric power with $300,000 capital, by George H. Lovatt, Hendry D. Langdon and Gladstone E. Pakenham, all of Toronto.

LACHINE, QUE.—Kennoway Sheet & Metal Mfg. Co. Ltd. has been incorporated to manufacture and deal in metal from ore to finished product with $250,000 capital by Bernard Devlin, Andre Taschereau and Louis P. Pigeon, all of Quebec.

New Trade Publications

IRON PRODUCTS—Alamo Iron Works, San Antonio, Tex., has issued an illustrated booklet announcing its fiftieth anniversary and giving a history of the company and its products.

SAND MIXER—Flynn & Emerich Co., Holliday and Saratoga streets, Baltimore, is circulating a 4-page folder on its sand mixer. The advantages of the machine are given and several views show its features.

INDUCTION MOTORS—Allis-Chalmers Mfg. Co., Milwaukee, has issued a bulletin on its polyphase induction motors, illustrated and containing full description of construction, efficiency and operation. Drawings of details are included.

REAMERS—Morse Twist Drill & Machine Co., New Bedford, Mass., has issued a leaflet announcing a new reamer with advantages claimed over previous types. It has a shearing cut with graduated taper, high cutting capacity with low power. Three grooves add to its capacity.

LATHES—South Bend Lathe Works, South Bend, Ind., has issued a bulletin describing its junior back geared screw cutting lathe. A variety of sizes and drives is presented. A horizontal motor drive is a novelty in connection with this equipment. Illustrations show full details of the lathe and its parts.

DIESEL ENGINES—A current bulletin by the Chicago Pneumatic Tool Co., New York, describes a type of its diesel engine from 80 to 240 horsepower. Illustrations include cross sections to show operation. All details are shown in picture and explained in the text. Engineering data are provided.

PURIFIER TRAYS—A purifier tray for use in gas machines is described in a current bulletin by the Semet-Solvay Engineering Corp., New York. It is entirely of wood, being fabricated with dowels. This does away with the corrosion of metal bolts by the sulphur content of the gas.

COMPRESSORS—A bulletin by the Worthington Pump & Machinery Corp., New York, covers its vertical feather-valve compressors. It is presented in question-and-answer form, each section being illustrated where possible. An unusual method of treatment apparently carries the information more clearly than the conventional method of simply stating the facts.

ARC WELDING—General Electric Co., Schenectady, N. Y., has issued a 4-page folder on its constant potential arc-welding sets. A description of the apparatus is given and its advantages stated. Tables give specifications for various sizes. Illustrations show typical installations. This company also is distributing a folder on its gas engine driven arc-welder, which describes both stationary and portable types.

SPRINGS—A catalog of its springs of many varieties has been issued by the William D. Gibson Co., Chicago. It covers compression, torsion, special flat and extension springs from a variety of materials, for widely different uses. A section for the use of engineers goes into the theory and practical determination of the load for a spring of any given dimension. Rules for determining the various factors and formulas for actual determinations are given. The catalog is illustrated. It also contains various tables of sizes, gages and weights.

To Manufacturers of Vitreous Enameled Products

ESPECIALLY made for vitreous enameling, "Wabik Metal" Sheets provide just the right degree of porosity to give the enamel permanent, unyielding grip. Of course they are guaranteed not to warp or fracture.

And year after year more manufacturers constantly are finding these special sheets exactly the right material for stove door panels, broiler pans, table tops, refrigerator linings, advertising signs and all other flat work that calls for durable, high-grade vitreous enameling.

There's every chance "Wabik Metal" will prove just the material you've been looking for and we know you will find it worth while to investigate. Simply tell us your problem. We'll be glad to *show* you definitely and conclusively how we can be of service.

Empire Steel Corporation, Mansfield, O.

SALES OFFICES: New York, Philadelphia, Cleveland, Indianapolis, Cicero (Suburb of Chicago), Detroit, St. Louis

WABIK METAL

"The Base For Distinctive Enameling"

Discounts and Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

Lap Weld

2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

(Note—Large jobbers obtain additional preferential discounts of 1 and 5 on black and 1½ and 5 on galvanized. Extra 5 per cent granted in the 4th quarter 1927 and 1st quarter 1928 discontinued April 2, 1928.)

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLING

Butt Weld

¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 3-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG, PLAIN ENDS

¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14

Lap Weld

2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 and 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	.....

(Note—Large jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized.)

Boiler Tubes

Pittsburgh carload discounts. Less carloads 4 points less

STEEL (Lap Weld)

2 and 2¼-inch	27 off
2½ and 2¾-inch	37 off
3-inch	40 off
3¼ to 3¾-inch	42½ off
4 to 4½-inch	46 off
5 to 6-inch	40 off

(Note—Additional discounts of seven extra 5 per cents now being given on 21,000 pounds or more.)

CHARCOAL IRON

1½-inch	+18
1¾-inch	+ 8
2 and 2¼-inch	2 off
2½ to 3-inch	7 off
3¼ to 4½-inch	9 off

(Note—Additional discounts of two 10's and one 2½ now being given on 12,000 pounds or more.)

SEAMLESS COLD DRAWN

1-inch	63 off
1¼ and 1½-inch	55 off
1¾-inch	39 off
2 and 2¼-inch	34 off
2½ and 2¾-inch	42 off
3-inch	48 off
3¼ and 3½-inch	50 off
4-inch	53 off
4½, 5 and 6-inch	45 off

SEAMLESS HOT ROLLED

2 and 2½-inch	40 off
2½ and 2¾-inch	48 off
3-inch	52 off
3¼ and 3½-inch	56 off
4-inch	59 off
4½, 5 and 6-inch	48 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off
Carbon 0.30 to 0.40 per cent.....45 to 50 off

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Net prices per foot f.o.b. Pittsburgh Gage	Price
21-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	33c
5⅜-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, dated Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weigh—

Over 100 inches to and including 110 inches	.05c
Over 110 inches to and including 115 inches	.10c
Over 115 inches to and including 120 inches	.15c
Over 120 inches to and including 125 inches	.25c
Over 125 inches to and including 128 inches	.50c

Plates less than ¼-inch or lighter than 11 pounds per square foot.

Over 72 inches to and including 84 inches	.10c
Over 84 inches to and including 96 inches	.20c
Over 96 inches to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including 3/16-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds per square foot ..... .20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including 3/16-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds per square foot ..... .20c

Plates ordered 7.65 pounds per square foot ..... .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. navy department or equivalent specifications	1.00c
Boiler steel subject to U. S. navy department specifications, classes A and B	1.50c
Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.	

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet	No extra
Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts. (Including straight taper plates)

Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with reentrant angles)

Additional extra ..... .20c